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For related information see also *Astronautics*.

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Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

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Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2604

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

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Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 2607

Includes cockpit and cabin display devices; and flight instruments.

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07 AIRCRAFT PROPULSION AND POWER 2609

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Includes powered and free-flight trajectories; and orbit and launching dynamics.

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18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 2615

Includes spacecraft thermal and environmental control; and attitude control.

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19 SPACECRAFT INSTRUMENTATION 2616

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76 SOLID-STATE PHYSICS **2767**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **2769**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **2769**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **2770**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 2771
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS 2772
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE 2772
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION N.A.
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) 2774

89 ASTRONOMY 2774
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 2775
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 2776
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS 2778
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 2781
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL N.A.

Note: N.A. means that no abstracts were assigned to this category for this issue.

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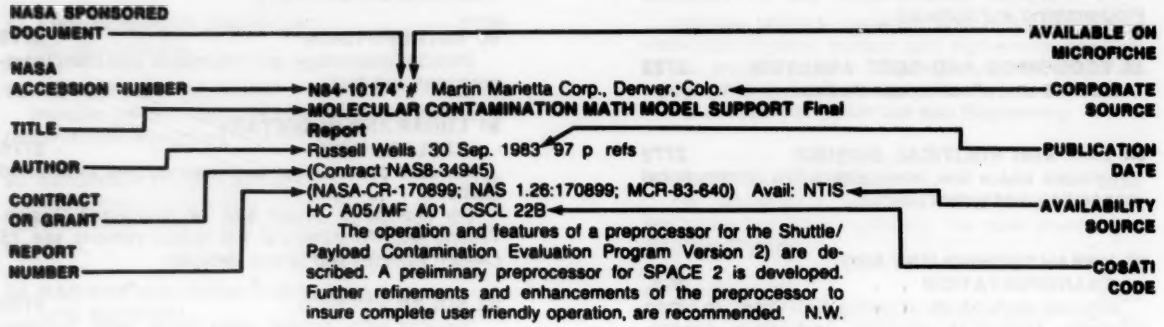
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The operation and features of a preprocessor for the Shuttle/ Payload Contamination Evaluation Program Version 2) are described. A preliminary preprocessor for SPACE 2 is developed. Further refinements and enhancements of the preprocessor to insure complete user friendly operation, are recommended. N.W.

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Scientific and Technical Aerospace Reports

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01 AERONAUTICS (GENERAL)

N84-26565# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Flugfunk und Flugdatentechnik.

PROCEEDINGS OF THE 12TH SYMPOSIUM ON AIRCRAFT INTEGRATED DATA SYSTEMS

Feb. 1984 578 p refs Symp. held at Brunswick, 20-22 Sep. 1983

(DFVLR-Mitt-84-01) Avail: NTIS HC A25/MF A01

Problems associated with the application of aircraft integrated data systems (AIDS) were discussed. The AIDS-systems used for monitoring and recording flight and aircraft condition and performance were described. Safety, reliability and economy of aircraft operation were considered. The present state and future developments in this field were outlined. For individual titles, see N84-26566 through N84-26586.

N84-26566# Flight Data Co., London (England).

ARE WE GIVING AIRCRAFT INTEGRATED DATA SYSTEMS USERS THE BEST INFORMATION IN THE BEST WAY AT THE BEST TIME? c06

P. Waller and E. R. White *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 9-23 (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

The use of aircraft integrated data systems (AIDS) in the analog aircraft is discussed. The introduction of serial digital data transmission and distributed processing, with the inherent capability for providing much of the information expected from the earlier AIDS, necessitates reconsideration of the way in which the user is provided with what he wants. Flight deck output, (displayed or printed); conventional recording; data transfer by cassette or milking; air-ground RF transmission are considered. Data collection, processing and transmission to the ultimate user is examined with examples from real life. Author (ESA)

N84-26567# Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (West Germany).

ACCESS TO MAINTENANCE VIA AIRCRAFT INTEGRATED DATA SYSTEM (AIDS): FUTURE ASPECTS OF THE EXPANDED AIDS c06

H. Kalbe *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 25-50 (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

An expanded A310 AIDS is introduced. The amount of available data is examined. Data which could be used for maintenance of the connected aircraft systems are discussed. The access to these data and their use in maintenance is demonstrated. Future possibilities of AIDS are discussed. Author (ESA)

N84-26568# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

INTELLIGENT FLIGHT DATA RECORDER: A CONTRIBUTION TO ON-CONDITION MAINTENANCE AND OPTIMIZATION OF OPERATION c06

B. Mueller and U. Schulz *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 51-70 (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

Starting from existing accident data recorder (ADR) systems and flight data acquisition units (FDAU) a design of an improved FDAU using standard microprocessor and memory technology is described. The range of applications in addition to the accident data recorder task leads to the on-condition maintenance concept and optimization of operations while reducing in parallel the amount of ground support equipment. The result is a remarkable increase of cost effectiveness. Author (ESA)

N84-26569# National Aerospace Lab., Amsterdam (Netherlands).

OPERATIONAL LOADS ON B-747 AIRCRAFT: DESIGN ASSUMPTIONS, ACTUAL EXPERIENCE AND MAINTENANCE ASPECTS c06

D. J. Spiekhout and C. W. J. vanLummel *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 71-106 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

Usage and loading environment data relevant for fatigue were selected from the standard AIDS recordings of B-747 aircraft. The data are stored in a data base (> 16,000 flights). Groups of flights can be selected from this data base for statistical analysis. By comparing experience with design assumptions, adjustments to the maintenance program (inspection intervals) are possible. Author (ESA)

N84-26570# Rolls-Royce Ltd., Bristol (England).

THE DEVELOPMENT OF MILITARY AIRCRAFT ENGINE MONITORING SYSTEMS c06

C. M. OConnor and R. L. Thompson (Plessey Radio Systems, Havant, England) *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 107-141 (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

Digital engine monitoring development is summarized. Monitoring started with the analysis of basic engine parameters acquired using relatively simple data logging equipment. As the analysis of these data demonstrated that distinct benefits were practicable, the number of parameters monitored increased, permitting more comprehensive calculations. Commensurate with the progress in microelectronics, a second generation engine monitoring system for Harrier aircraft which provided the capability for on-board data reduction and recording was designed. This was fundamental to pioneering the development of the compact integrated systems now being introduced. Author (ESA)

N84-26571# Deutsche Lufthansa Aktiengesellschaft, Cologne (West Germany).

ENGINE CONDITION MONITORING WITH AIRCRAFT INTEGRATED DATA SYSTEMS ON LUFTHANSA A310 c06

H. Reilaender and H. Schlueter *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 143-163 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

Experience gained during more than a decade in engine condition monitoring (ECM) was used to develop an advanced ECM concept for A310 aircraft engines in order to reduce engine operating cost. Mechanical and thermodynamic condition of the engine down to the modular level, and its control system are monitored. The aircraft integrated data system includes automatic data recording through expanded instrumentation, preprocessing and real time output using an onboard printer. The ground based parts of the system are designed around automated real time data processing and data analysis. Author (ESA)

N84-26572# Deutsche Lufthansa A.G., Hamburg (West Germany).

FIRST EXPERIENCE WITH ARINC 717 AIRCRAFT INTEGRATED DATA SYSTEMS (AIDS) ON AIRBUS 310 FOR MAINTENANCE SUPPORT c06

P. Ladwig *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 165-182 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

Logistics problems involved in operating the A-310 aircraft integrated data system are discussed. Real time print report, manual selection, and the return of the message to home base as fast as possible for engineering analysis are described. Data selection out of over 1000 available airplane parameters and identification on magnetic tape for automatic data processing at ground data stations are outlined. Aircraft system data readability on ground without the need of additional test equipment is treated. Maintenance experience examples are provided. Author (ESA)

N84-26573# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).

FAILURE IDENTIFICATION MODULE (FIM) FOR DIGITAL CONTROL SYSTEMS c06

G. Dahl *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 183-202 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

It is argued that trouble shooting of avionic systems is too expensive. Defects reported to the maintenance crew or other failures indicated on the maintenance panel are often not confirmed in the following trouble shooting, because of incorrect or incomplete objections or because of unspecified or unconsidered disturbances to the unit. To make the trouble shooting easier and more reliable and to decrease the rate of unconfirmed defects a failure identification module (FIM) is proposed. During the preflight and the postflight test phase, as well as during the operation phase of the controller, this FIM records essential data of the controller and its safety systems. The data are stored in a non volatile memory, so are available despite a power failure. At the end of the mission the automatic analysis indicates the defective line replaceable unit on a failure display with high probability. Author (ESA)

N84-26574# National Transportation Safety Board, Washington, D. C.

UPGRADED AIRCRAFT ACCIDENT RECORDER STANDARDS c06

Carol A. Roberts *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 203-242 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

United States work in upgrading and redefining standards for flight data recorders (FDR) and cockpit voice recorders (CVR) is summarized. For CVRs, crash protection standards are lower than for FDRs, and CVR sound quality standards are low compared to the current state of the art, since they were written in the early 1960s. The United States needs an updated Technical Standard Order (TSO) for CVRs which upgrades standards for both electronic design and crash and fire protection. A new TSO for digital flight data recorders is also necessary. The TSO should not only set standards for digital recording, but should also set standards for crash and fire protection. Author (ESA)

N84-26575# Ministry of Transport and Civil Aviation (England). Accidents Investigation Branch.

DEFICIENCIES OF CURRENT FLIGHT DATA RECORDERS IN ACCIDENTS INVESTIGATION c06

R. A. Davis *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 243-275 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

Remedial actions which would improve the value of digital flight data recorders (DFDR) as a investigative tool in aircraft accidents are proposed. The DFDR manufacturers need to develop better in-built test facilities and fault diagnosis. Operators should tighten their maintenance requirements for flight recorder installations and should record and store calibration data. Regulatory authorities should legislate for additional parameters and sampling rates on large sophisticated aircraft. Author (ESA)

N84-26576# Fairchild Weston Systems, Inc., Sarasota, Fla.

THE FAIRCHILD DIGITAL FLIGHT RECORDER (DFR) F 800 c06

Hans F. Napfel *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 277-312 (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

The development and design of the Fairchild Digital Flight Recorder (DFR) are outlined. The DFR uses the Fairchild Cockpit Voice Recorder (CVR) data storage and protection package; and the majority of parts are common to both equipments. Recorder operation and its interface with simple business type computers or with more elaborate computer/data processing systems in use at major airlines are described. Examples of flight data presentation are provided. The use of small portable data recovery units on the aircraft are also described, along with data results and automatic testing capabilities. Author (ESA)

N84-26577# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugmechanik.

ANALYSING REDUNDANT FLIGHT PATH DATA ON TWO AIRBUS A-300 AIRCRAFT c06

O. Weber and G. Rosenau *In its* Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 313-348 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

Reconstruction of aircraft flight paths from integrated data system recordings is discussed. Airbus A-300 takeoff and landing, and short segments of straight and level flight data were analyzed. Trajectory was determined by integration of the differential equation system for the longitudinal or three-dimensional motion using recorded acceleration, heading and attitude data. The parameters of the computed trajectories were compared with redundant data recorded on board or routinely on the ground. The analyses suggest that the aircraft integrated data systems (AIDS) designed according to ARINC 573 suffer a performance limitation in that the sampling rates of relevant parameters are relatively low and the body-angle rate is not primarily measured. These systems are suited for analyzing short flight paths before incidents or accidents, but they might be unsuitable for identifying flight-mechanical parameters of special aircraft. The AIDS on board the Airbus A-310 which complies with ARINC 717 provides for such applications through an additional special recorder. Author (ESA)

N84-26578# Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.

PERFORMANCE VALIDATION OF LEAR SIEGLER FLIGHT MANAGEMENT SYSTEMS c06

M. K. DeJonge *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 349-368 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

The Lear Siegler Flight Performance Data Computer System was evaluated by tests ranging from pilot recorded data at the end of each flight to the use of an airborne recording system. Data reduction and analysis techniques are described. The information is used in determining the number of aircraft and the evaluation period required for meaningful performance validation. Review of data gathered during the evaluations provides insight into practical limitations, and highlights several controls which should be placed on data-gathering flights in order to improve the quality of performance measurements. Author (ESA)

N84-26579# Delco Systems Operations, Milwaukee, Wis.
DELCO PERFORMANCE MANAGEMENT SYSTEM FLIGHT TEST EVALUATION c06
J. Kaufman *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 369-394 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

Flight tests of a performance management system (PMS) were conducted on a DC-10 and a Boeing 747 aircraft to determine the fuel savings potential of a PMS through precise pitch and thrust control rather than changing the operating policy of the airlines. Digital recorders were installed on the aircraft. Approximately 40 variables from the PMS were recorded every 4 sec. The recorder operated on PMS-controlled flights and flights on which the PMS was inhibited. Ground-based programs reduced the data from 1000 flights, comparing fuel savings in climb, cruise, step-climb and descent. In all cases the results show significant fuel savings on PMS-coupled flights. Author (ESA)

N84-26580# Sperry Rand Corp., Phoenix, Ariz. Flight Systems Div.
PERFORMANCE VALIDATION OF SPERRY FLIGHT MANAGEMENT SYSTEMS (FMS) c06
Roger Keller *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 395-431 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

A fuel validation system was developed to determine the fuel savings achievable by using a digital flight management system (FMS) in normal aircraft operations. The system is designed to accumulate and statistically compare data from FMS-off flights, and determine fuel savings as a function of any preselected parameter. The fuel validation system is also designed to interface with a fast-time simulator in the FMS. The user can duplicate the actual flight and investigate fuel savings by introducing the flight environment, mode conditions, and aircraft conditions into the simulation. Author (ESA)

N84-26581# British Airways, Middlesex (England).
AIRLINE EXPERIENCE WITH AVIONIC SOFTWARE DEVELOPMENT FOR AIRCRAFT INTEGRATED DATA SYSTEMS c06
Colin Murfet *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 433-457 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

The use of processor controlled aircraft integrated data systems (AIDS) by British Airways is discussed. Software accounts for an increasing proportion of the total cost, and in-service experience often reveals shortcomings in specification or implementation. British Airways undertook its own software development, starting with minor program changes and progressing to completely new software. For the nonmandatory part of its Boeing 757 system, the airline took complete software responsibility. Despite difficulties, the program is valuable in line service, and can be further developed at relatively low cost by the engineers who produced it.
Author (ESA)

N84-26582# Societe de Fabrication d'Instruments de Mesure, Massy (France).
AIRCRAFT INTEGRATED DATA SYSTEMS (AIDS) ON MEDIUM SIZE AIRCRAFT c06
M. Penetro *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 459-482 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

Modifications to aircraft integrated data systems (AIDS) for use in medium size aircraft are outlined. In order to reduce the installation costs, mandatory parameters acquisition and AIDS function are in a single housing. Engine parameters are most important for short haul aircraft. Onboard processing is reduced, with flight sequences stored in a nonvolatile built-in mass memory. Processing in done on the ground by a small computer in charge of the whole fleet. An AIDS system in accordance with these requirements is installed aboard the ATR 42 aircraft. Author (ESA)

N84-26583# Naval Air Test Center, Patuxent River, Md.
THE SILICON AIDS (AIRBORNE INTEGRATED DATA SYSTEMS) c06
Daniel M. Watters, Joseph A. Alfano (NADC), and Dennis Amundson (Sperry Corp.) *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 483-508 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

Airborne Integrated Data Systems (AIDS) in US military aircraft evolution from analog monitoring and recording systems to the first generation distributed microcomputer multiplex bus digital AIDS is traced. The development of high density nonvolatile memory chips (8K bits to 64K bits) is discussed. Digital sensor and audio data compression techniques enhance systems integration and hardware compression. Digital audio processing and compression techniques, and the integration of fiber optics multiplex busing, navigation ground proximity warning, and flight control systems are considered. Author (ESA)

N84-26584# Naval Air Test Center, Patuxent River, Md.
CRASH POSITION INDICATOR/CRASH SURVIVAL FLIGHT DATA RECORDER (CPI/CSFDR): EJECTABLE VERSUS NON-EJECTABLE c06
Daniel M. Watters *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 509-534 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

The use by carrier aircraft of nonejectable, and by military aircraft of both ejectable and nonejectable crash position indicator/crash survival flight data recorder/crash survival cockpit voice recorder (CPI/CSFDR/CSCVR) systems is discussed. The relevance of aircraft mission, acquisition and maintenance costs, complexity, reliability, record survivability, weight, volume, and power are considered. Ejectable CPI/CSFDR/CSCVR systems should be used on aircraft that operate over water. All other aircraft could use either ejectable or nonejectable systems. Author (ESA)

N84-26585# Technische Univ., Brunswick (West Germany). Inst. fuer Flugfuehrung.
ON-LINE ACQUISITION AND PROCESSING OF FLIGHT MECHANICAL DATA ON BOARD THE RESEARCH AIRCRAFT OF THE TECHNISCHE UNIVERSITAET, BRUNSWICK c06
Artur Redeker *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 535-553 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

A Dornier 28 research aircraft was equipped with flight parameter sensors and a powerful on-board measuring and computer system for on-line data acquisition. Software is divided into a real time computational process and a background monitoring program. The real time process determines all important flight mechanical data. System users can link own software modules (FORTRAN IV) to the real time process as well as to the monitoring task. The possibility of monitoring flight test processes provides early error detection and reduces flight times. Author (ESA)

N84-26586# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.

PILOT-AIRCRAFT INTERACTION CONCERNING A WIND SHEAR INDICATION SYSTEM **c06**

Uwe Teegan and Monika Mittendorf *In its* Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 555-577 refs (For primary document see N84-26565 17-01)

Avail: NTIS HC A25/MF A01

A wind shear indication system with an airborne sensor and filter concept resulting in an indicator control characteristic demanding thrust control was developed. Two different display versions were evaluated in a flight simulator experiment with 12 airline pilots. The results show differences in individual pilot performance. Preference of a higher integrated indication system can be stated from objective data as well as subjective pilot opinions. Modification of indicator intention resulting in a thrust command display with direct relation to thrust lever setting is an optimal system design. Author (ESA)

N84-26587# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

OPTICAL AND HUMAN PERFORMANCE EVALUATION OF HUD (HEAD-UP DISPLAY) SYSTEMS DESIGN Summary Report, Nov. 1982 - Mar. 1983

W. L. Martin, R. D. Lee, A. P. Ginsburg, L. V. Genco, and H. L. Task 15 Dec. 1983 89 p

(AF Proj. 718-4)

(AD-A140601; AFAMRL-TR-83-095; ASD/ENA-TR-83-5019) Avail: NTIS HC A05/MF A01 CSCL 01/3

Eight technical papers, each by a different author, cover several aspects of head-up display (HUD) technology, emphasizing the state-of-the-art and test and evaluation of HUD systems. Authors represent several specialists and laboratories. The papers, by number, cover: (1) An overview of HUD optical design (optics), (2) Measurement of HUD optical quality (optical engineering), (3) Optical interactions of aircraft windscreens producing diplopia (physiological optics), (4) Sun/Moon capture evaluation (optics), (5) Contrast loss and target detection (engineering psychology), (6) Assessing HUD performance with contrast sensitivity measurements (biophysics/psychology), (7) Physical interaction of the HUD (applications engineering), and (8) Future development trends for HUD displays (development engineering). For individual titles, see N84-26588 through N84-26595.

N84-26588# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.

OVERVIEW OF HUD (HEAD-UP DISPLAY) OPTICAL DESIGNS **c74**

R. D. Lee *In* Aerospace Medical Research Labs. Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 4-10 (For primary document see N84-26587 17-01)

(AD-P003157) Avail: NTIS HC A05/MF A01 CSCL 01/3

The Head-Up Display (HUD) and the new technologies being applied to it continue to receive great attention by people considering the functioning of fighter and attack aircraft cockpits. The subject has also received its fair share of attention over the last two years at NAECON as well. Berry and Byrd (1981) described the wide field of view (FOV) HUD being developed as part of the Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) program. Gard (1982) gave a presentation which described the different roles of diffraction optics as used in HUDS and relatively new optical designs which achieve a wider FOV. This discussion summarizes the material covered by these two papers and serves to form a common basis of understanding of the various HUD technologies. The important features highlighted here figure prominently in the discussions which follow. GRA

N84-26589# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

MEASUREMENT OF HUD (HEAD-UP DISPLAY) OPTICAL QUALITY **c74**

H. L. Task *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 11-19 (For primary document see N84-26587 17-01)

(AD-P003158) Avail: NTIS HC A05/MF A01 CSCL 01/3

This section describes the optical quality measurement procedures that were adopted to evaluate the LANTIRN HUD. The objective of these measurements was to determine how suitable the HUD optics were for matching human visual requirements. The measurements were directed to the optical components and did not include the cathode-ray tube (CRT) and symbology generation quality. Measurements fell into two broad categories, those that characterized visual quality viewing through the combiner (effect on outside world target acquisition) and those that concentrated on the visual characteristics associated with viewing the symbology. Measurement procedures for each of these parameters will be described with its relationship to and effect on vision. GRA

N84-26590# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

OPTICAL INTERACTIONS OF AIRCRAFT WINDSCREENS AND HUDS (HEAD-UP DISPLAYS) PRODUCING DIPLOPIA **c74**

L. V. Genco *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 20-27 (For primary document see N84-26587 17-01)

(AD-P003159) Avail: NTIS HC A05/MF A01 CSCL 01/3

The Air Force is in the process of evaluating new, wide field of view heads-up displays (WFOV HUDs) capable of presenting an enhanced array of visual imagery to pilots of modern aircraft. The main findings of this study are: (1) observers are relatively intolerant of negative disparity, (2) longer viewing is more likely to lead to a diplopia effect than very short glances, (3) resistance to disparity appears to be an individual trait, and (4) a large proportion of responses involve suppression of the view from one eye. The overall median negative disparity threshold was 1.2 mrad and the overall positive threshold was 2.6 mrad. These values are recommended as the maximum disparities acceptable for wide-field-of-view Canopy-HUD optical systems. Since the values are so small, we further recommend that the canopy and HUD be treated as a system, with technical interaction between the vendors, and between the vendors and the USAF. The disparity values indicate the net difference between both system components, so optimization may be possible by appropriately matching the optics. GRA

N84-26591# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.

SUN/MOON CAPTURE EVALUATION **c74**

W. Wilson *In* Aerospace Medical Research Labs. Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 28-30 (For primary document see N84-26587 17-01)

(AD-P003160) Avail: NTIS HC A05/MF A01 CSCL 01/3

Because of their optical characteristics, head-up displays (HUDs) have always interacted with various kinds of sunlight to produce unwanted reflections. Capture means that a HUD can and will capture or trap light and direct it into a pilot's eyes. This capture effect can result in both reflections and retroflections. Reflections occur when an external light source impinges on a reflective surface. Retroflections are light reflections that result from external light entering the HUD optics train, reflecting off the face of the cathode ray tube (CRT), and passing back out through the optics. Both the reflected and the retroflected image are called reflexes. With the introduction of diffractive optics technology, there is a need to describe how diffraction and conventional optics perform in the presence of collimated light sources, such as that provided by the Sun and Moon. GRA

N84-26592# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

ESTIMATING DETECTION RANGE AND RANGE LOSS LOOKING THROUGH WINDSHIELDS AND HEAD-UP DISPLAYS **c54**

H. C. Self *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 31-54 (For

primary document see N84-26587 17-01)
(AD-P003161) Avail: NTIS HC A05/MF A01 CSCL 06/16

It is very important for an aircraft pilot to be able to detect distant objects. His ability to do so is impaired by loss of target contrast due to the atmosphere and to passive optical elements through which he must look. These elements are the aircraft's windshield and head-up display (HUD) and his own helmet visor and spectacles or sun glasses. The problem is to determine loss of target detection range due to loss of contrast. This report examines loss of detection range by combining sighting geometry with the contrast transmission of the atmosphere and other optical elements and with human ability to detect targets. Numerical examples will be presented as tutorial exercises and target detection ranges for selected conditions will be worked out in detail to familiarize the reader with the graphical method derived in this paper. GRA

N84-26593# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
DIRECT PERFORMANCE ASSESSMENT OF HUD (HEAD-UP DISPLAY) DISPLAY SYSTEMS USING CONTRAST SENSITIVITY **c54**
A. P. Ginsburg *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 55-66 (For primary document see N84-26587 17-01)
(AD-P003162) Avail: NTIS HC A05/MF A01 CSCL 01/3

A major problem with creating performance-related metrics has been the lack of analytical throughput, that is, the ability to characterize relevant target information in the same language used to specify system capability, visual processes and performance metrics such as detection range. Unified metrics of display quality are neded that directly relate target information to display capability and operator performance. Although the physics of displays are well understood, there has been a lack of understanding and inability to quantify visual target acquisition. However, increased understanding of visual science now, when coupled with linear systems analysis, promises to create unified performance-based metrics. In particular, contrast sensitivity changes to sine-wave gratings imaged through a display system yield a contrast sensitivity function that can be related to detection range. The spatial frequency bandwidth of relevant target information can be related to changes in the contrast sensitivity function, which, in turn, can be related to changes in target contrast and detection range. This paper discusses an application of this approach for quantifying the detection range impact of several different headup (HUD) displays. GRA

N84-26594# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
PHYSICAL INTEGRATION OF THE HUD (HEAD-UP DISPLAY) **c06**
R. W. Schwartz *In* Aerospace Medical Research Labs. Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 67-73 (For primary document see N84-26587 17-01)
(AD-P003163) Avail: NTIS HC A05/MF A01 CSCL 01/3

The physical integration of the HUD into the aircraft crew station used to be a relatively simple matter once the basic design parameters for the crew station were established, particularly the over-the-nose vision angles and the location of the design eye. The HUD was then mounted in the upper portion of the instrument panel and integrated into the surface of the glare shield, along the over-the-nose vision angle, with the optics oriented so that the center line of the collimating bundle passes through the design eye. There were minor problems with this method, the most notable being a tendency for pilots to sit higher than the design eye. The integration of the new LANTIRN HUD into the F-16, however, brought a whole new set of problems. GRA

N84-26595# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
FUTURE DEVELOPMENT TRENDS FOR HEAD-UP DISPLAYS **c06**
J. F. Coonrod *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 74-82 (For primary document see N84-26587 17-01)
(AD-P003164) Avail: NTIS HC A05/MF A01 CSCL 01/3

The development of diffraction optics to provide the largest possible Field Of View (FOV) has been, and will continue to be, the most difficult and important area of HUD design. As larger FOV's are developed, greater demands will be placed on display resolution. The display of grey scale video places increased demands on improved display brightness. Significant reliability improvements are also needed. This paper outlines current state-of-the-art and indicates potential future improvements that can be made in these areas. GRA

N84-26596# Dayton Univ., Ohio.
CONFERENCE ON AEROSPACE TRANSPARENT MATERIALS AND ENCLOSURES
S. A. Marolo Dec. 1983 166 p Held at Scottsdale, Ariz. on 11-14 Jul. 1983
(Contract F33615-80-C-3401; AF Proj. 1926)
(AD-A140701; AFWAL-TR-83-4154) Avail: NTIS HC A08/MF A01 CSCL 01/3

The purpose of this report is to make available the technical papers presented at the Fourteenth Conference on Aerospace Transparent Materials and Enclosures. Fifty three technical papers are presented in seven sessions that address transparent material for enclosures, coatings for transparencies; transparency design; bird impact resistance; human factor and optics; operational problems; design criteria on transparent plastics, glasses, and elastomers; aircraft-structural integration of windshields and canopies; testing techniques; and cost of ownership reduction. The papers contained herein have been reproduced directly from the original manuscripts. For individual titles, see N84-26597 through N84-26649.

N84-26597# Space Ordnance Systems, Inc., Saugus, Calif.
PYROTECHNIC CLEAR PATH EGRESS SYSTEM FOR THE T-38 TRAINER AIRCRAFT **c03**
S. Phillips *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 2-24 (For primary document see N84-26596 17-01)
(AD-P003184) Avail: NTIS HC A08/MF A01 CSCL 01/3

Training for low altitude flying has resulted in the need to upgrade windshield and forward canopy structures to eliminate bird impact related injuries. The existing canopy and structure provides little protection against impact on a four pound bird at 400 knots. The primary T-38 egress system using ballistic gas for canopy jettison is compatible with the bird resistant canopy requirement. However, the backup modes are incompatible. In these modes the seat/man ejects through the canopy for in-flight egress, with ground egress achieved by piercing the canopy with a weighted blade. This incompatibility has created the need for a safe, reliable pyrotechnic backup system for incorporation with the thicker, stronger bird resistant canopy requirement. However, the backup modes are incompatible. In these modes the seat/man ejects through the canopy for in-flight egress, with ground egress achieved by piercing the canopy with a weighted blade. This incompatibility has created the need for a safe, reliable pyrotechnic backup system for incorporation with the thicker, stronger bird resistant canopy. GRA

N84-26598# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
BATTLE DAMAGE REPAIR OF BIRDSTRIKE RESISTANT LAMINATED TRANSPARENCIES **c05**
D. A. Crocker *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 25-45 (For primary document see N84-26596 17-01)
(AD-P003185) Avail: NTIS HC A08/MF A01 CSCL 01/3

Aircraft battle damage repair is a growing area of concern in today's Air Force. Methods of quickly repairing battle damaged aircraft in the field are currently being developed to provide increased sortie generation rates in a wartime environment. A battle

damage repair program for bird impact resistant laminated transparencies is currently underway. This program is designed to evaluate experimental battle damage repair techniques for bird impact resistant laminated transparencies. Representative laminated transparencies have been ballistically damaged to simulate various anticipated threats. The experimental battle damage repair procedures have been applied to the damaged transparencies. The final portion of this program will consist of pressure and thermal fatigue testing of the repaired transparencies to determine the structural integrity of the repairs. The results of this program will be used to define additional development efforts and to determine the applicability of the repair techniques to other aircraft transparency systems. GRA

N84-26599# McDonnell Aircraft Co., St. Louis, Mo.
WINDSHIELD WEIGHT REDUCTION THROUGH THE USE OF HIGH STRENGTH GLASS AND POLYURETHANE INTERLAYERS **c05**
J. H. Lawrence, Jr. *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 46-56 (For primary document see N84-26596 17-01)
(AD-P003186) Avail: NTIS HC A08/MF A01 CSCL 01/3

Polyurethane interlayers were developed during the 1970s and are a potential replacement material for the polyvinyl butyral interlayer, specified in MIL-G-25871, for laminated glass. In addition to the interlayer, higher strength glass has become available through the advancement of manufacturing techniques for thermally tempering glass that appears to be an improvement over thermally tempered glass, specified in MIL-G-25667. Through minor modifications, current laminated glass windshields could be redesigned to utilize these new materials. Potentially, the resultant effect could be a weight reduction or an improvement for aircraft cold dispatch capabilities. To fully quality a redesigned windshield for commercial aircraft, testing and analysis is required to meet FAA requirements for bird impact, fail-safe, environmental (anti-ice and defog), and optical qualities. To utilize these new materials, full-size windshield specimens interchangeable with the DC-10/KC-10 were tested successfully to the FAR 25 requirements. The weight difference between the production windshields versus the lighter weight windshields was 17.5 pounds nominal. GRA

N84-26600# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
NEW AIRCRAFT WINDSHIELD APPLICATIONS USING ION EXCHANGE GLASS **c27**
W. W. Hornsey and W. F. Rothe *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 57-70 (For primary document see N84-26596 17-01)
(AD-P003187) Avail: NTIS HC A08/MF A01 CSCL 01/3

The primary goal of the test program was to develop stress versus velocity curves for each of seven cross sections. To minimize the effect of other variables, the samples were 26 inches square with radius corners and were fabricated with outboard glass thickness and interlayer thicknesses held constant while the internal and inboard glass ply thicknesses were varied. Each sample was instrumented with a minimum of one 2-element rosette strain gage on the inboard glass surface opposite the impact point. Prior testing had confirmed that the maximum stress would always be at the inboard surface of the inner glass ply on two structural ply laminates. Some samples had additional element gages above and below the impact point to determine the peak stress location. To determine the effect of test frame stiffness, curves were developed at a 37 degree angle to the bird path in two different test frames. GRA

N84-26601# Sierracin Corp., Sylmar, Calif.
A NEW AND UNIQUE CONDUCTIVE ELEMENT FOR AIRCRAFT TRANSPARENCIES **c05**
J. B. Olson and D. M. Trebes *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 72-107 (For primary document see N84-26596 17-01)
(AD-P003188) Avail: NTIS HC A08/MF A01 CSCL 01/3

A significant breakthrough in transparent conductive elements has been achieved by extending and modifying sophisticated microcircuitry technology to the scale and materials used in aircraft windshields. The resultant conductive element possesses more potential for versatility than any contemporary transparent element type. Like conventional wiggle-wire elements, this new element is comprised of myriad thin filaments which are too small to be individually visible from normal distances. Based on a photolithographic technology and lacking mechanical constraints, however, this unique element produces infinitely more design flexibility than the conventional wire elements. Design parameter such as wave form, pitch, amplitude, filament width and spacing can be varied at will, even on the run; i.e., within a given filament. The technique lends itself to computerization, and general programs have been developed to provide design solutions in minutes. GRA

N84-26602# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
T-38 STUDENT WINDSHIELD BIRDPROOFING EFFORTS UTILIZING METAL AND COMPOSITE MATERIALS FOR AFT ARCH REINFORCEMENT **c03**
J. M. Schlueter *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 108-133 (For primary document see N84-26596 17-01)
(AD-P003189) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper provides a review of the T-38 arch reinforcement as it relates to the T-38 Birdproofing Program. Due to the increase in low level training missions in the T-38 aircraft, there exists a need for an improved transparency system capable of withstanding a four (4) pound bird impact at 400 knots. The existing student windshield frame is made of cast magnesium alloy (AS9LC-T6) and is neither strong enough nor stiff enough to support a windshield or canopy during the bird resistant transparency system for the T-38. As a result, three methods of reinforcing the frame are under consideration: (1) a three piece metal casting, (2) a continuous composite, and (3) a continuous machined or stretched formed high strength metal reinforcement. GRA

N84-26603# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
DEVELOPMENT OF LIGHTWEIGHT COMMERCIAL AIRCRAFT WINDSHIELDS WITH NEW HIGH STRENGTH GLASSES **c05**
W. E. Gourley and H. E. Littell, Jr. *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 134-157 (For primary document see N84-26596 17-01)
(AD-P003190) Avail: NTIS HC A08/MF A01 CSCL 01/3

To evaluate the effect of increased surface compression on failure resistance, it was necessary to test instrumented windshields and measure surface stress versus velocity for different designs. A resulting test program included 164 bird impacts against 28 full-size, flat windshields incorporating different interlayers and glass plies of varying thicknesses at varying locations and temperature conditions. This paper presents the results of the program in the form of stress-velocity curves and pass-fail results for different designs. It also shows the evolution of a design which features a thick high strength thermally tempered core for load carrying and a thin chemically strengthened inboard ply to enhance fail-safe yet survive the stresses which occur during impact. The thick/thin high strength glass windshield met all bird impact qualification tests at Boeing and subsequent thermal-pressure certification. This design concept was also employed for lighter weight retrofit applications for other commercial aircraft windshields. GRA

N84-26604# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
TRANSPARENCY TECHNOLOGY NEEDS FOR MILITARY AIRCRAFT **c05**
R. H. Walker *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 158-172 (For primary document see N84-26596 17-01)
(AD-P003191) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper attempts to identify transparent enclosure technology needs and separates the needs by technology areas such as

design, testing, system, etc. As there are numerous technology needs identified, some condensing and/or combining of specific needs is necessary; although as many needs as possible are discussed in sufficient detail to provide the reader a clear understanding of the problem area and what technology is needed to fill a particular void. It is expected that the entire transparency technical community can find within this description of needed technologies, areas of work which fall within their individual interest and capabilities as a company or government agency and to which they may address some future effort, thus helping to solve the many problems facing transparency systems of the future. GRA

N84-26605# Texstar Corp., Grand Prairie, Tex.
TESTING POLYCARBONATE FOR UTILIZATION IN THE PRODUCTION OF TRANSPARENT ENCLOSURES c27
A. J. Bonje and J. Irion *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 174-182 (For primary document see N84-26596 17-01)
(AD-P003192) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper looks at the polycarbonate now being utilized in the fabrication of high performance aircraft enclosures. Polycarbonate is now being utilized both in a monolithic form and in conjunction with traditional enclosure materials; such as acrylic, and glass. It is the intent of this paper to look at the testing and evaluation of polycarbonate prior to processing into acceptable enclosure hardware. The present procurement specifications such as MIL-P-83310 or L-P-393 are inadequate in addressing materials properties that are critical in the processing and fabrication of acceptable hardware. Since material properties can determine acceptable hardware and therefore the yield from any given lot of material, this can dramatically effect the price of finished goods. In addition, these material properties can ultimately impact the quality and life of the finished enclosures. GRA

N84-26606# National Research Council of Canada, Ottawa (Ontario).
DEGRADATION OF THE BIRD IMPACT RESISTANCE OF POLYCARBONATE c27
J. B. R. Heath and R. W. Gould *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 183-211 (For primary document see N84-26596 17-01)
(AD-P003193) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper describes a program, comparing the bird impact resistance of new as-extruded polycarbonate with polycarbonate that has undergone natural aging, artificial heat aging, fabrication heat treatments, and fabrication heat treatments with subsequent artificial heat aging. The two pound bird impacts were carried out on flat 24 inch by inch monolithic specimens mounted 45 degrees to the horizontal. A rigid test frame incorporating a clamped specimen edge design was utilized. Bird impacts on the modified material resulted in a significant decrease of penetration velocity, with a corresponding change from a ductile to a brittle type failure mode. GRA

N84-26607# Dayton Univ., Ohio.
THE EFFECT OF ACCELERATED ULTRA VIOLET WEATHERING ON THE RAIN EROSION RESISTANCE OF COATED AIRCRAFT TRANSPARENCIES c27
C. J. Hurley and G. F. Schmitt *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 213-236 (For primary document see N84-26596 17-01)
(AD-P003194) Avail: NTIS HC A08/MF A01 CSCL 01/3

Three proprietary coatings on monolithic polycarbonate transparency material were examined. The coated polycarbonate materials were exposed to one and three years of accelerated ultra violet exposure. The specimens were then exposed at a 30 degrees impact angle to a simulated one inch/hour rainfall at 500 mph in the AFWAL Mach 1.2 Rain Erosion Test Apparatus. Percent coating removal as a function of rainfield exposure was determined. Accelerated UV weathering exposure did not directly affect the coatings' behavior under rainfield exposure conditions but did have an indirect effect on the adhesion of the coatings to the polycarbonate substrate materials. SEM techniques are the most effective in assessing the role of mechanistic processes in rain erosion phenomena. GRA

N84-26608# Materials Research Labs., Melbourne (Australia).
SERVICE-LIFE INDUCED FAILURE OF BIRD IMPACT RESISTANT WINDSHIELDS c03
P. J. Burchill and R. H. Stacewicz *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 238-259 (For primary document see N84-26596 17-01)
(AD-P003195) Avail: NTIS HC A08/MF A01 CSCL 01/3

Bird-impact resistant transparencies (BIRT), which are laminates of modified poly(methylmethacrylate), polycarbonate and a rubbery interlayer, have been fitted to all Royal Australian Air Force F111C aircraft. However, their service-life has often been severely limited by factors other than bird-impact, and in one instance was as little as 30 flying hours for an alternate design bird-impact resistant transparency (ADBIRT) windshield. Unserviceability has arisen due to cracks, crazes, delamination, optical distortions or scratches; the most critical are cracks and crazes. All failed first generation windshields (BIRT) examined showed crazing of the inner acrylic layer, while 60% of them had serious crazing of the outer acrylic layer, and in 35% this layer was cracked. With ADBIRT windshields all failures examined were crazed, while some were cracked or showed delamination. The shapes of the crazes seen on these windshields show that the stresses involved in their formation and growth are complex. GRA

N84-26609# British Airways, Middlesex (England).
SOME CRAZING EXPERIMENTS ON AS-CAST ACRYLIC TO MIL-P-8184 c27
K. B. Armstrong *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 260-274 (For primary document see N84-26596 17-01)
(AD-P003196) Avail: NTIS HC A08/MF A01 CSCL 01/3

A first set of experiments was done to provide threshold crazing stress data on As-cast acrylic to MIL-P-8184 using a variety of fluids likely to be found in an airline environment. A second set of experiments was done to study the effect of water soluble cutting oils on acrylic. The oils were for potential use as corrosion inhibitors on a machine for sanding acrylics. A third and smallest experiment was to study the effect of de-icing fluid (propylene glycol) on cast acrylic following the discovery of de-icing fluid between the inner and outer panes on Trident passenger windows. The results of these experiments led to the measurement of a crazing stress of water and also cast doubt upon using threshold crazing stresses after 30 minutes testing. It would appear that some fluids do not reach their threshold in 30 minutes and need to be tested for a longer time. GRA

N84-26610# Naval Research Lab., Washington, D. C.
THE EFFECTS OF MOISTURE ON FRACTURE TOUGHNESS AND THERMAL RELAXATION OF STRETCHED ACRYLIC PLASTICS c39
J. Tirosh, S. A. Sutton, P. W. Mast, R. W. Thomas, and I. Wolock *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 275-295 (For primary document see N84-26596 17-01)
(AD-P003197) Avail: NTIS HC A08/MF A01 CSCL 01/3

Studies were conducted to determine the effects of absorbed moisture on the thermal relaxation behavior and fracture toughness of stretched acrylic plastic. Results indicated that the thermal relaxation behavior is affected significantly by the amount of absorbed moisture. Test results can be obtained on the same material that meet or do not meet the requirements of that specification, depending on the moisture content of the test specimens. Fracture toughness tests were conducted over a range of loading rates and for different moisture contents, using the compact tension specimen. The material with a high moisture content had a higher fracture toughness than dry material at lower rates of loading. At high loading rates, moisture content did not affect fracture toughness. Thus, if a specification stipulates a high loading rate for the fracture toughness test, control of moisture content is not necessary. Data previously obtained on polycarbon-

ate plastic indicates that this material has a higher fracture toughness than stretched acrylic for lower moisture contents. However, at high moisture contents, there is little difference between the two materials for the thicknesses and loading rates studied. GRA

N84-26611# National Research Council of Canada, Ottawa (Ontario).
COMPARISON OF BULLET RESISTANCE OF NEW AND AGED POLYCARBONATE **c39**
J. B. R. Heath, R. W. Gould, and E. B. Stimson *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 296-337 (For primary document see N84-26596 17-01)
(AD-P003198) Avail: NTIS HC A08/MF A01 CSCL 01/3

The effects of aging on the ballistic characteristics of monolithic polycarbonate were studied. The program was carried out in two parts. Part 1 compared the decrease in bullet velocity after penetration of new to aged polycarbonate panels, and Part 2 compared the behavior of new to aged panels where penetration does not occur. No appreciable difference was noted in residual bullet velocity between those bullets which penetrated the different panels. In assessing bullet resistance through non-penetration, no significant change was observed due to degradation of the polycarbonate. It was noted however, that both the artificially aged and naturally aged specimens behaved somewhat unpredictably and both showed signs of being susceptible to the initiation of fractures upon bullet impact. GRA

N84-26612# Allied Chemical Corp., Morristown, N.J.
NEW HIGH PERFORMANCE WINDSHIELD/CANOPY MATERIALS **c05**
B. T. DeBona and D. C. Prevorsek *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 339-381 (For primary document see N84-26596 17-01)
(Contract F33615-78-C-5077)
(AD-P003199) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper covers a three year program to develop new, thermally stable, transparent plastics for use high performance aircraft windshields and/or canopies. Forty-seven new materials were prepared during this period, each with a glass transition temperature exceeding those of currently used acrylic and polycarbonate plastics, and possessing varying degrees of transparency, color and impact strength. Substitution of thermally stable, aromatic diols and diacids by appropriate techniques for bisphenol-A in modified preparatory procedures for polycarbonates and polyesters has resulted in more thermally stable materials. Depending upon the reactants involved, new polyesters, polycarbonates, polyester-carbonates, copolyesters and copolyester-carbonates were prepared. Concepts governing the choice of monomers and their effects on final polymer properties is presented along with a brief discussion on the importance of molecular chain entanglement in the glassy state. GRA

N84-26613# Boeing Commercial Airplane Co., Seattle, Wash.
AN INDUSTRY TEST PROGRAM FOR INTERLAYER EQUIVALENCY **c39**
P. H. Bain *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 382-406 (For primary document see N84-26596 17-01)
(AD-P003200) Avail: NTIS HC A08/MF A01 CSCL 01/3

After the announcement in 1980 that Monsanto will have to discontinue production of their interlayer Saflex PT due to the non availability of 3 GH plasticizer, an Industry team, under the auspices of the Aerospace Industries Association (AIA), was formed to identify and obtain approval for a replacement interlayer. A test program was derived to examine the physical, mechanical and operational characteristics of candidate replacement materials and compare them to those of the current PVB/3GH. Typical production batches of material were procured and the test program was completed by an Industry cooperative effort. The program demonstrated a high degree of equivalency and finally resulted in FAA approval of an interlayer as a general direct replacement for all existing designs of glass windshields utilizing PVB/3GH interlayer in either a bird bouncing or bird bagging mode. It is believed that this is the first time a windshield material has received FAA approval without the usual expensive certification program normally required for each design. GRA

N84-26614# Naval Research Lab., Washington, D. C.
FLUROEPOXY AND FLUROACRYLIC TRANSPARENCIES **c27**
J. R. Griffith *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 407-414 (For primary document see N84-26596 17-01)
(AD-P003201) Avail: NTIS HC A08/MF A01 CSCL 01/3

Heavily fluorinated epoxy resins and acrylic polymers which have been synthesized and developed at NRL during the last fifteen years are transparent, nearly colorless plastics of low refractive index which seem to be prime candidates for aerospace transparency applications. The presence of 50% or more fluorocarbon in these classes of well-known polymers impart some properties which are uncommon and may be of special benefit in selected instances. For example, a helicopter with a fluoropolymer canopy could be expected to have better visibility in a rain storm than one with a conventional type because the unusual hydrophobicity of the fluorinated material would prevent wetting and consequent shimmering on the surfaces. Also, the refractive indices of the fluoropolymers are quite low compared to those of the common materials and this should result in less optical distortion of transmitted light. GRA

N84-26615# Coors Porcelain Co., Golden, Colo.
POLYCRYSTALLINE MgAl2O4 SPINEL FOR HIGH PERFORMANCE WINDOWS **c27**
D. W. Roy and J. L. Hastert *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 415-426 (For primary document see N84-26596 17-01)
(AD-P003202) Avail: NTIS HC A08/MF A01 CSCL 01/3

There is a need for optical materials which are highly transparent at wavelengths from the ultraviolet to the infrared, hard enough to resist high speed rain erosion, strong enough to resist mechanically or thermally induced fracturing and are inexpensive to fabricate. Magnesium aluminate spinel possesses an unusual combination of optical, dielectric, physical and mechanical properties that make it an attractive candidate for windows on EP systems that are moving at very high speeds, and is cost effective when compared with sapphire. Spinel is cubic and optically isotropic; thus polycrystalline shapes may be fabricated without the severe scattering problems inherent in noncubic materials. In the microwave region the isotropy of spinel prevents localized absorption and heating that occurs in noncubic materials because of differing grain boundary orientation and anisotropic dielectric loss index. Spinel undergoes no polymorphic transformations and is thus free of problems due to thermally induced phase changes. GRA

N84-26616# Swedlow, Inc., Garden Grove, Calif.
AN IMPROVED ACRYLIC SHEET MATERIAL WITH ENHANCED CRAZE RESISTANCE **c27**
M. V. Moncur and W. F. Fisher *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 428-450 (For primary document see N84-26596 17-01)
(AD-P003203) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper describes a new acrylic material developed by Swedlow, Inc., Acrivue 351, which has been designed to provide improved resistance to water-induced crazing when compared to current acrylic materials. Acrivue 351 combines the high inherent craze resistance of MIL-P-8184 acrylic plastic with the low moisture uptake characteristic of MIL-P-5425. Stretching of Acrivue 351 further enhances its inherent craze resistance. Results of lab craze studies are presented, comparing as-cast Acrivue 351 to MIL-P-8184 and MIL-P-5425 acrylic materials. Standard solvent stress crazing tests were used to determine craze resistance of these materials as a function of water content. The crazing stress advantage of Acrivue 351 over the other cast acrylic materials increases upon exposure to moisture. Other properties of Active 351 are very similar to MIL-P-8184 acrylic sheet. GRA

N84-26617# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
PROTECTIVE LINEAR MATERIALS FOR TRANSPARENT PLASTICS c27
J. E. Mahaffey and T. G. Rukavina *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 451-467 (For primary document see N84-26596 17-01)
(AD-P003204) Avail: NTIS HC A08/MF A01 CSCL 01/3

Parasitic plies such as acrylic used to protect polycarbonate from the environment in aircraft transparencies and undesirable weight and are subject to crazing. PPG Industries has recently developed a family of elastomeric liner materials specifically formulated to provide complete isolation of the substrate to which it is substrate. This paper describes two specific liner materials. The first was designed to withstand the relatively severe environments encountered on the exterior surface of an aircraft transparency. The second was developed for use on the inboard surface where environmental considerations are not as demanding. Comprehensive testing and evaluation of these liners have been performed by PPG over the past two years. Environmental-resistance testing has included humidity exposure, ultraviolet radiation, chemical resistance, rain erosion resistance, accelerated and natural weathering, and abrasion resistance. The results of these tests have been very encouraging and the liners are currently being tested on full-scale transparencies. In addition, the outboard liner has been flight-tested for over a year with excellent results. The complete testing program for these liners, including field service performance, will be reviewed. GRA

N84-26618# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
HEAT RESISTANT COPOLYESTER-CARBONATE TRANSPARENT PLASTICS c27
T. J. Reinhart *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 468-495 (For primary document see N84-26596 17-01)
(AD-P003205) Avail: NTIS HC A08/MF A01 CSCL 01/3

Air Force service experience with state-of-the-art transparent plastics has demonstrated the need for improved materials. A project was started to evaluate research samples of copolyester-carbonate (PEC) plastics received from the Allied Corporation as a result of a research and development contract funded by the Materials Laboratory of the Air Force Wright Aeronautical Laboratories. Mechanical, physical and chemical properties of the PEC materials were evaluated in order to assess the potential to the material for use in aircraft transparencies. It was found that the PEC materials possess several advantages over the state-of-the-art polycarbonate plastics and that the materials showed promise for use in high performance transparencies. GRA

N84-26619# Swedlow, Inc., Garden Grove, Calif.
SPECIALTY COATINGS FOR INCREASED SERVICE LIFE OF ACRYLIC AIRCRAFT TRANSPARENCIES, PART 2 c27
W. C. Harbison *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 496-525 (For primary document see N84-26596 17-01)
(AD-P003206) Avail: NTIS HC A08/MF A01 CSCL 01/3

Swedlow's abrasion resistant coatings on acrylic windows have now provided up to eight years serviceability against the harsh environments of people abuse and automated cleaning procedures. The superior performance of the Swedlow coatings over that of all other commercially available coatings has been confirmed by many independent facilities. General Motors Corp., for example, has recently approved only two coatings, Swedlow's SS-6590 and SS-6712, for use on the formed acrylic sunroofs for their 1984 Corvette. This represents the first significant entry for plastics into automotive transparencies in this country. In aircraft applications, the SS-6590 and SS-6712 coatings are undergoing extensive laboratory and flight testing. Coated as-cast acrylic windshields have demonstrated excellent abrasion and chemical resistance in non-pressurized general purpose and agricultural spray aircraft. On stretched acrylic material, the coatings conform to CAR 3.27(a) and 3.396(a) pressurization testing and have successfully achieved over 5000 flight hours on cabin windows in a TWA operated 727 aircraft. GRA

N84-26620# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
IN-FLIGHT MEASUREMENT OF PRESSURE DISTRIBUTION OVER T-38 STUDENT CANOPY c02
W. R. Pinnell *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 527-552 (For primary document see N84-26596 17-01)
(AD-P003207) Avail: NTIS HC A08/MF A01 CSCL 01/3

As part of a current in-house effort supporting the development of bird impact resistant transparencies for T-28 aircraft, a system for measuring aerodynamic pressure distribution over a T-38 student canopy has been developed. Static pressures were measured at 103 positions on the canopy of an aircraft in flight. Flight conditions included speeds in the range from 50 (taxi) to 500 knots, 5 degree side slip, and stalled flight. The paper includes a description of the in-flight recording system, the utilization of a microcomputer and software for data reduction and analysis, and test results. This concept of testing and measurement is believed to be unique and to have potential application to other transparency testing including measurement of in-flight loads and temperatures. GRA

N84-26621# Defense Material Administration, Stockholm (Sweden). Flight Safety Unit.
SWEDISH AIR FORCE MAINTENANCE PROGRAMME FOR AGED TRANSPARENT ENCLOSURES FOR JET TRAINER AND JET FIGHTER AIRCRAFT
R. Forss *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 553-569 (For primary document see N84-26596 17-01)
(AD-P003208) Avail: NTIS HC A08/MF A01 CSCL 01/3

An investigation involving FMV, SAAB-SCANIA and FFV Maintenance triggered a chain of activities concerning questions about the structural reliability of acrylic enclosures 10-15 years old or more, and questions about different types of edge attachment defects, and methods for the detection of hidden edge defects. The Acrylics Defect Prism Inspection Method was re-invented and further developed, making is possible to detect defects such as cracks, delaminations and bond separations within the otherwise concealed regions of the edge attachments of windshields and canopies. The prism inspection of the inner sides of the transparency edges is done from the outside of the enclosure. Today the aged windshields and canopies of the SAAB-SCANIA 35 Draken and the canopies of the SAAB-SCANIA 105 trainer are periodically inspected and the defects are traced. The SAAB-SCANIA 37 Viggen enclosures are due for a similar inspection program. GRA

N84-26622# Measurements Group, Inc., Raleigh, N.C.
MEASUREMENT OF RESIDUAL STRAINS AND STRESSES IN TRANSPARENT MATERIALS c39
A. S. Redner and T. W. Corby, Jr. *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 570-580 (For primary document see N84-26596 17-01)
(AD-P003209) Avail: NTIS HC A08/MF A01 CSCL 11/9

Measurement of birefrigence is a straight forward process that can be accomplished on any transparent or partly transparent material by using methods described in presently existing standards. Present methods permit observation and inspection of large non-flat objects by using either transmission or reflection photoelastic techniques. The method is applicable to a large variety of polymers, as shown in Table 1. In some partly crystalline polymers, the birefringence is observed even in a totally strain-relieved condition, and special care must be exerted to avoid misinterpretation. Using material constants from Table 1 (or by obtaining via the calibration process described above), one can calculate residual strains from the measured birefrigence, and thus obtain valuable information revealing the quality or safety margin of the tested part. GRA

N84-26623# Ministry of Defence, London (England).
ARTIFICIAL AGING OF TRANSPARENT AEROSPACE MATERIALS **c27**
A. Davis *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 582-596 (For primary document see N84-26596 17-01)
(AD-P003210) Avail: NTIS HC A08/MF A01 CSCL 01/3

The AECMA working party which is drawing up a standard for the artificial weathering of aircraft transparencies has through a collaborative experimental program shown the importance of measuring the output of ultraviolet radiation of the various lamps used in weathering chambers. A simple method of monitoring radiation below 320 nm, based on the use of polysulphone film, is described. The manufacture and properties of the film are presented along with details of its use. Variability in the output of a Xenon-arc source as a result of lamp and filter aging is demonstrated and data on the ultraviolet intensity of different types of lamp are compared with measurements made outdoors at Dhahran, Innisfail and London. GRA

N84-26624# Boeing Commercial Airplane Co., Seattle, Wash.
THE NEED FOR APPLICATION OF DYNAMIC MECHANICAL ANALYSIS IN THE EVALUATION OF INTERLAYER MATERIALS **c39**
A. Jayarajan *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 597-618 (For primary document see N84-26596 17-01)
(AD-P003211) Avail: NTIS HC A08/MF A01 CSCL 01/3

Interlayer materials like Polyvinyl Butyral (PVB), Silicone and Urethane are viscoelastic in their mechanical behavior. Mechanical properties of a viscoelastic material are not only dependent on temperature, but also highly dependent on frequency or strain rate. Dynamics mechanical analysis provides an effective experimental tool to measure the viscoelastic properties over a wide range of temperatures and in the time range of a few seconds up to 10 to the minus 5th power seconds. It is especially suitable for studying the viscoelastic nature of interlayer materials since the temperature and strain rate conditions for windshield design and service are within the measurement and analytical capabilities of DMA. GRA

N84-26625# Dayton Univ., Ohio.
SIMULATION OF EXPOSURE OF AIRCRAFT TRANSPARENCIES TO FLIGHT LINE ENVIRONMENT **c05**
A. Piekutowski *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 619-634 (For primary document see N84-26596 17-01)
(AD-P003212) Avail: NTIS HC A08/MF A01 CSCL 01/3

During the major portion of their lifetime, aircraft transparencies are subjected to the flight line environment. Processes initiated or aggravated by exposure to the elements usually reduce the useful life of the transparency. A procedure for developing an accelerated flight line environment test is presented. Determination of the acceleration rate of weathering simulated in the test cycle is based on the definition of a so-called worst case day for exposure to ultraviolet radiation. Acceleration rate for the simulated flight line environment test was determined by dividing the total dosage of ultraviolet radiation produced by a constant laboratory source in the test environment by the total amount of ultraviolet radiation which would have been absorbed during a year of worst case days. In the combined flight and flight line environment test facility, the test article was exposed to ultraviolet radiation produced by fluorescent sunlamps and black lights. A year of normal exposure to ultraviolet radiation was simulated in two months of testing. GRA

N84-26626# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
AIRCRAFT TRANSPARENCY TESTING METHODOLOGY **c05**
M. E. Kelly *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 635-655 (For primary document see N84-26596 17-01)
(AD-P003213) Avail: NTIS HC A08/MF A01 CSCL 01/3

Accurately predicting in-service durability of aircraft transparencies is beyond the present state-of-the-art. There are, however, approaches to testing and evaluating candidate designs and materials that may provide more useful test results than some of the more commonly used test methods. A testing methodology has been derived that uses a logical combination of exposure conditions and test methods to evaluate the durability of plastic aircraft transparency materials. While most testing naturally involves coupons, durability testing of full scale transparencies is also recommended. A large, complex facility has been constructed which can impose combinations of temperatures, pressure differentials, and exposure conditions that represent both the in-flight and flight line environments. This paper describes the tests and exposures recommended in the methodology, plus describes the preliminary conclusions and lessons learned from using the full scale testing equipment. GRA

N84-26627# Civil Aviation Authority, Redhill (England). Airworthiness Div.
CIVIL AIRCRAFT WINDSCREEN DAMAGE DUE TO BIRD-STRIKES **c03**
J. Thorpe *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 658-676 (For primary document see N84-26596 17-01)
(AD-P003214) Avail: NTIS HC A08/MF A01 CSCL 01/3

Brief details are presented of all known cases world wide of penetration of civil aircraft windshields. The information is divided into: (1) transport aircraft (piston engine aircraft are excluded), (2) twin engined general aviation aeroplanes, (3) single engined aeroplanes, and (4) helicopters. Windshield design requirement criteria are summarized. Examination of the data shows that penetration of transport aircraft windshields is extremely rare and damage to the outer pane is very rare (in Europe one per 1.5 million flying hours). There would appear to be little justification for a change in the current 1.8 Kg (4 lb) bird design requirement. There have been three fatal windshield penetrations on twin engined general aviation aircraft and six cases of injury. Many of the birds were large. The trend towards single pilot operations carrying a significant number of passengers (up to 22) may suggest a need for windshield design requirements, even though the rate of penetration is not high. GRA

N84-26628# Air Force Engineering and Services Center, Tyndall AFB, Fla.
USAF AIRCRAFT WINDSHIELD/CANOPY BIRD STRIKES **c03**
R. C. Kull *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 677-689 (For primary document see N84-26596 17-01)
(AD-P003215) Avail: NTIS HC A08/MF A01 CSCL 01/3

The United States Air Force loses millions of dollars due to bird strikes each year. The most serious damage to the aircraft and injury to the pilot occurs when birds penetrate the windshield/canopy system. The Air Force Bird/Aircraft Strike Hazard (BASH) Team has recorded over 1000 bird strikes on windshields and canopies since 1975. With this extensive amount of data, trends have been found relating to the types of aircraft, phases of flight, and types of birds most vulnerable to being involved in a serious windshield/canopy strike. This report discusses these trends, as well as the types of birds encountered and focuses on F-4 and F-16 weapon systems. GRA

N84-26629# Royal Netherlands Air Force, Volkel.
INCREASING BIRDSTRIKE RATES AND IMPROVED BIRDSTRIKE ANALYSIS OF THE ROYAL NETHERLANDS AIR FORCE **c03**
L. S. Buurma *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 690-715 (For primary document see N84-26596 17-01)
(AD-P003216) Avail: NTIS HC A08/MF A01 CSCL 01/3

An increasing concern about the birdstrike risk did not prevent some Western European countries, like The Netherlands, from being faced with an increasing birdstrike problem. The primary aim of the paper is to show why birdstrike statistics to a varying

extent fail to produce a realistic picture of the birdstrike risk. Several type of biases will be described. The problems can be reduced by improving reporting standard and, especially, by taking microscopic examination of minuscule bird remains as a routine procedure. The most important result is a substantial growth of data on the species and weight distribution of birds struck en route. In the case of high but normal jet fighter cruising speeds 80% of all two-pound birds involved in birdstrikes appear to have caused damage. GRA

N84-26630# Saab-Scania, Linkoping (Sweden). Aerospace Div.
INVESTIGATIONS CONCERNING IMPROVEMENTS OF THE SAAB 37 WINDSHIELD BIRDSTRIKE RESISTANCE c03
B. P. Fonden and K. I. Persson *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 717-729 (For primary document see N84-26596 17-01)
(AD-P003217) Avail: NTIS HC A08/MF A01 CSCL 01/3

In 1980 some tests at Holloman AFB indicated that the windshield had less resistance than previously anticipated. Further birdgun tests were started in Sweden. A method for accurate measuring of windshield deflections using high speed cameras was also developed. Beside establishing the protection level given by the serial windshield, the tests also made clear that the windshield might rupture below its undisturbed strength, if the bird impact made it deflect to contact with underlaying equipment. The head-up display was the main but not the only such equipment. Also birdspray entering the cockpit between the deflected windshield and the canopy was a major problem. The study now concentrated on establishing the probabilities of aircraft losses due to birdstrikes. Calculations were performed both regarding overall loss rates and risk levels for individual aircraft versus speed. The calculations specially dealt with the improvements that could be gained by a number of proposed modifications and the safety levels achieved. GRA

N84-26631# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
BIRD IMPACT EVALUATION OF THE F/RF-4 TRANSPARENCY SYSTEM c03
R. Simmons and G. J. Stenger *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 730-755 (For primary document see N84-26596 17-01)
(AD-P003218) Avail: NTIS HC A08/MF A01 CSCL 01/3

Birdstrikes to the crew enclosures of USAF F/RF-4 aircraft have resulted in major aircraft damages coupled with severe/fatal pilot injuries. Analysis of operational bird impact statistical data indicates that the trend of damaging bird impacts on the F-4 is continuing to rise. Impacts to the F-4 transparency system also continue to rise resulting in a continued flight safety risk to the aircraft and the aircrew. The Air Force Wright Aeronautical Laboratory, Improved Windshield Protection Office has initiated a program to develop a transparency system for the F-4 aircraft which has four pound, 500 knot bird impact capability. The first step in this program was to experimentally determine the existing transparency system capability by bird impact testing full scale flight hardware. Eight impact locations on the windshield and forward canopy were tested to failure with four pound birds. Tests on experimental, laminated windshield side panels were also conducted to investigate the capability of the windshield frame. The baseline birdstrike test results are presented through the use of post test photographs and an impact capability diagram. GRA

N84-26632# Dayton Univ., Ohio.
ALTERNATE T-38 TRANSPARENCY DEVELOPMENT c05
B. S. West and K. I. Clayton *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 756-775 (For primary document see N84-26596 17-01)
(AD-P003219) Avail: NTIS HC A08/MF A01 CSCL 01/3

The T-38 missions at speeds above the existing crew enclosure damage threshold will result in flight safety risk to aircraft and crew. This paper summarizes the design/development of alternate T-38 transparencies having the capability of defeating the impact of a four pound bird at aircraft speeds up to 400 knots. A preliminary design and evaluation defined the guidelines and constraints governing the modifications, defined and assessed candidate transparency configurations, and conducted a birdstrike risk assessment. Edge attachment screening tests were conducted fracture mechanism, and energy absorption potential. A parametric finite element analysis examined the effects of transparency and support structure stiffness versus peak load and deflection. A full-scale flight hardware test program established the failure threshold for the existing T-38 forward windshield and forward canopy for a four pound birdstrike at six impact locations. GRA

N84-26633# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
A TRIANGULATION TECHNIQUE FOR OBTAINING DEFLECTIONS OF AIRCRAFT TRANSPARENCIES DURING BIRD IMPACT TESTING c39
W. R. Pinnell and D. A. Crocker *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 776-791 (For primary document see N84-26596 17-01)
(AD-P003220) Avail: NTIS HC A08/MF A01 CSCL 01/3

A technique for determining a time history for the displacement in space of points on the inside surface of an aircraft transparency during and after the simulated impact of a bird has been developed. This method utilizes two high speed motion picture cameras located in a three dimensional space which also contains designated points on the transparency surface. The cameras are positioned so that a common field of view contains points for which deflection history is required. Displacements of the images of given points in the film frames from each camera are used to obtain positions in a three dimensional space. All optical magnifications and changes in point to camera distances are accounted for. In addition to obtaining deflection data for selected points, the films are also useful for describing the footprint of the bird on the transparency, an important improvement in the ability to model bird loading in computerized dynamic analysis efforts. As an example of the application of this process, data resulting from a bird impact on a T-38 windshield are included. GRA

N84-26634# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
VISUAL EFFECTS OF F-16 CANOPY/HUD (HEAD-UP DISPLAY) INTEGRATION c54
L. V. Genco *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 793-807 (For primary document see N84-26596 17-01)
(AD-P003221) Avail: NTIS HC A08/MF A01 CSCL 01/3

Future fighter aircraft will be fitted with Wide Field of View Head Up Displays (WFOV HUDs), and probably, curved windscreens. Initial flight tests with a WFOV LANTIRN HUD in an F-16 fighter resulted in test pilots complaining of several visually related problems. One of the complaints was of double vision. Either two aiming symbols or two targets were seen when the pilot kept both eyes open. Other complaints included those of blurred images and a change in depth perception when looking through the HUD-canopy combination. This paper is a report of some of the work done by the Air Force Aerospace Medical Research Laboratory in an attempt to determine both the source of the problem and possible solutions. GRA

N84-26635# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
OPTICAL EFFECTS OF F-16 CANOPY-HUD (HEAD-UP DISPLAY) INTEGRATION c74
H. L. Task *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 808-824 (For primary document see N84-26596 17-01)
(AD-P003222) Avail: NTIS HC A08/MF A01 CSCL 01/3

The F-16 heads-up display (HUD) provides the pilot with visual information in symbology form that is overlayed on the outside world scene in the forward viewing direction. This superposition of HUD symbology and outside world scene is done by using an optical combiner (beamsplitter) which is part of the HUD optical system. One of the critical items of information that is

displayed on the HUD is the aiming reticle that is used for air-to-air and air-to-ground weapon aiming. In order to be effective, it is essential that the aiming reticle be accurately boresighted to the weapon system. This requires a careful integration of the optical characteristics of the HUD and the aircraft canopy. There are several optical parameters that can affect target acquisition and aiming accuracy that involve the canopy, the HUD, and interactions between the two. The primary parameter that affects aiming accuracy is angular deviation due to the windscreen and/or the HUD. GRA

N84-26636# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
VISUAL PERCEPTION THROUGH WINDSCREENS: EFFECTS OF MINOR OCCLUSIONS AND HAZE ON OPERATOR PERFORMANCE **c52**
W. W. Kama *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 825-848 (For primary document see N84-26596 17-01)
(AD-P003223) Avail: NTIS HC A08/MF A01 CSCL 01/3

Current specifications and acceptance procedures regarding the size and number of minor defects (optical occlusions) permitted on aircraft transparencies reflect a marked lack of uniformity. Size requirements ranging from 0.035 to 0.25 inch and numbers allowed varying from 1 per square foot to 20 per zone are noted. Additionally, there is, at the present time, no objective means for determining when a transparency should be replaced due to the amount of halation found in it. To address these two problems, two experiments were devised and performed in the Windscreen Facility of the Air Force Aerospace Medical Research Laboratory. The first study sought to determine the effects of size and number (density per unit area) of minor optical defects contained in an aircraft transparency on the performance of a simulated air-to-air target acquisition task while the second sought to determine what relationship, if any, existed between the amount of haze emanating from a transparency and the amount of an observer's field-of-view (FOV) or visual field that is lost (rendered unusable) due to the presence of the haze. GRA

N84-26637# Micro-Surface Finishing Products, Inc., Wilton, Iowa.
THE REDUCTION OF LIFE-CYCLE COSTS THROUGH CONTINUING ACRYLIC MAINTENANCE
R. J. Stillman and H. A. Wilson *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 825-848 (For primary document see N84-26596 17-01)
(AD-P003224) Avail: NTIS HC A08/MF A01 CSCL 01/3

With the development of cushioned abrasives in 1960, a promising repair system for the maintenance of quality surfaces evolved, and in 1969 and 1970 the Military introduced the RS-69 repair kit and Mil-Spec 58091-A. Training programs at Ft. Rucker and other bases showed the way to extended life and reduced life cycle costs of aircraft transparencies. The process was adopted by all manufacturers of aircraft acrylics in the U.S. and abroad. Airlines were quick to realize the value of line maintenance to restore cabin or cockpit windows in place. Northrup Corporation in 1978 collaborated in the design of a new kit, the NC-78-1, which may become the new military kit, replacing the outdated RS-69. Air rework facilities are conducting seminars to upgrade the skill levels at their installations, and the aviation technical schools of the country are all teaching acrylic maintenance using cushioned abrasives. GRA

N84-26638# Sierracin Corp., Sylmar, Calif.
THE CERTIFICATION OF POLYCARBONATE TRANSPARENCIES: AN APPEAL FOR REASONABLE REQUIREMENTS **c05**
B. G. Hinds *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 859-873 (For primary document see N84-26596 17-01)
(AD-P003225) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper looks at the physical properties of polycarbonate relative to glass and acrylic. It explores the current FAA/CAA certification requirements for glass and acrylic, and the ways polycarbonate can be damaged in the manufacturing processes. In conclusion, it urges the FAA/CAA to treat polycarbonate windows as transparent structure and; recognizing the extent of the service life of aircraft glazings, not impose load factor requirements in excess of those required for other pressurized structure. It also urges the ASTM to develop standard procedures to evaluate as-processed polycarbonate to insure the finished product is free from induced strength or fatigue defects. Finally, it suggests the Air Force (the major user of polycarbonate in transparencies) should evaluate the effects of long-term environmental exposure on the structural characteristics of lazing materials including glass, acrylic and polycarbonate and their appropriate interlayers. GRA

N84-26639# Lufthansa German Airlines, Frankfurt (West Germany). Structures Group.
LUFTHANSA GERMAN AIRLINES EXPERIENCE WITH CABIN AND COCKPIT WINDOWS OF BOEING 707, 727, 737, 747, DOUGLAS DC10 AND AIRBUS A300 **c05**
K. W. Ewald *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 874-891 (For primary document see N84-26596 17-01)
(AD-P003226) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper highlights the experience as related to the various types of windows installed on all types of aircraft operated within Lufthansa, which are 15 B747, 14 DC10, 11 A300, 7 B707, 34 B727, 42 B737. After great improvements during 1970 to 1977 a remarkable deterioration in performance of cabin and cockpit windows is realized. The most important problems encountered are: Crazing, inplane cracking, deformation on acrylic windows, vinyl cracks, arcing, heating system failures, chips, cracks and distorted vision on multilayer windows, mainly glass windows. GRA

N84-26640# Royal Aircraft Establishment, Farnborough (England).
THE WIPER ABRASION AND RAIN EROSION RESISTANCE OF TRANSPARENT MATERIALS AND COATINGS FOR AIRCRAFT GLAZING **c27**
N. S. Corney and R. J. King *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 892-909 (For primary document see N84-26596 17-01)
(AD-P003227) Avail: NTIS HC A08/MF A01 CSCL 01/3

The requirements for improved abrasion and rain erosion resistance of transparent materials for helicopters and aircraft glazing have led to the development and application at NPL of a laboratory-scale wiper abrasion apparatus, and also to an investigation using the RAE rain erosion rig. The NPL apparatus employs the linear motion of a short windscreen wiper blade across a 50 mm diameter specimen. The characteristics of the blade, chose to produce even and reproducible abrasion over the rubber area. Surface condition is assessed in detail by Nomarski interference microscopy with a quantitative estimation of abrasion damage from profilometry, light scatter and transmittance measurements. The RAE rain erosion rig enables specimens to be exposed in a simulated rain field under conditions of known velocity and impact angle. Detailed examinations have been made of the progressive effects of rain erosion by weight loss and transmittance measurements. The in-service degradation of glazing materials as simulated by these techniques are compared. GRA

N84-26641# Civil Aviation Authority, Redhill (England). Airworthiness Div.
WINDSHIELD PROBLEMS ON UK OPERATED TRANSPORT SIZED JET AIRCRAFT 1976 TO 1982 **c05**
J. Thorpe *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 910-919 (For primary document see N84-26596 17-01)
(AD-P003228) Avail: NTIS HC A08/MF A01 CSCL 01/3

The paper reviews windshield problems reported between 1976 and 1982 on UK operated sized jet aircraft. The paper shows that external causes such as hail (four cases) and birds or lightning (one case each) are out weighted by problems with the windshield itself (157 cases). GRA

N84-26642# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

VALIDATION OF THE MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS) COMPUTER PROGRAM FOR NONLINEAR FINITE ELEMENT ANALYSIS OF AIRCRAFT TRANSPARENCY BIRD IMPACT c39

R. E. McCarty and J. L. Hart *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 921-972 (For primary document see N84-26596 17-01)

(AD-P003229) Avail: NTIS HC A08/MF A01 CSCL 01/3

The approach taken for validation of MAGNA is based on the simulation of full scale bird impact tests followed by a comparison of the experimental data with that computed by MAGNA. To date, five of these validation studies have been accomplished and several more remain to be conducted. This paper summarizes the results of the validation studies which have been completed to date and lists the user guidelines which have been established in the process. These first validation studies may be characterized as analyses of simple structures, i.e., only single transparent panels have been analyzed as opposed to complex systems of multiple panels joined by metallic edgemember support structure. These same studies may be further characterized as involving only simple definitions of boundary conditions and a somewhat arbitrary procedure for the explicit definition of bird impact pressure loading on the surface of the structure. The cases selected for study were a flat, laminated glass windshield panel; a curved, laminated glass windshield panel; a curved, laminated plastic windshield panel; a bubble-shaped monolithic plastic one-piece canopy; and a heated glass cylinder (which involved neither an aircraft transparency system per se nor bird impact loads). GRA

N84-26643# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS) COMPUTER SIMULATION OF BIRD IMPACT ON THE F-15 AIRCRAFT CANOPY c61

R. E. McCarty *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 973-1008 (For primary document see N84-26596 17-01)

(AD-P003230) Avail: NTIS HC A08/MF A01 CSCL 01/3

The F-15E aircraft is one of two evolutionary aircraft types which are currently being evaluated by the USAF for future low level, high speed, and attack and interdiction missions. It is a two-place aircraft and is proposed to utilize the windshield/canopy transparency system which has been in production for some years for the TF-15 aircraft. The canopy portion of this transparency system has a high lofted shape and offers considerably more presented frontal area than the canopy for one-place models of the aircraft. As a result of the lofted shape of the TF-15 canopy and the mission of the aircraft, the hazard of transparency bird impact during flight operations is significant. Some proposals to increase the level of bird impact protection for the F-15E canopy have already been aired. The availability of an analysis method which could accurately predict the dynamic structural response of such proposed canopy designs to bird impact loading would be valuable in establishing the merits of each. If the MAGNA nonlinear finite element analysis program could be validated for F-15 transparency analysis it would have significant potential for saving time and costs in the development of improved F-15E transparencies. GRA

N84-26644# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

SIMULATION OF T-38 AIRCRAFT STUDENT CANOPY RESPONSE TO COCKPIT PRESSURE AND THERMAL LOADS USING MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS) c61

R. E. McCarty and R. A. Smith *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1009-1039 (For primary document see N84-26596 17-01)

(AD-P003231) Avail: NTIS HC A08/MF A01 CSCL 01/3

The linear and nonlinear static response to cockpit pressure and (cold) thermal loads of the forward canopy for the T-38 aircraft has been predicted using the MAGNA (Materially and Geometrically Nonlinear Analysis) finite element computer program. The results obtained are compared to those of earlier analyses and full scale tests. It is concluded that the current canopy design when properly rigged can withstand more than 20 psig pressure, that thermal loads are more critical than cockpit pressure loads, and that providing more attachment fixity at both forward and aft arches would relieve stress concentrations which occur at the canopy corners. GRA

N84-26645# Dayton Univ., Ohio.

PARAMETRIC STUDIES OF THE T-38 STUDENT WINDSHIELD USING THE FINITE ELEMENT OF CODE MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS) c39

R. Nash *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1040-1055 (For primary document see N84-26596 17-01)

(Contracts F33615-76-C-3103; F33615-80-C-3401)

(AD-P003232) Avail: NTIS HC A08/MF A01 CSCL 01/3

The parametric studies examine the effect of structural variations on the nonlinear dynamic response of the T-38 student windshield/support structure system to bird impact. The studies were conducted using the MAGNA (Materially and Geometrically Nonlinear Analysis) finite element computer program. Both static and dynamic analyses were performed, examining the effects of changes to the transparency stiffness and intensity of the applied load, both coupled and uncoupled. Significant results of the finite element analysis include transparency deflection peak load versus transparency stiffness, and resultant force plots along the aft arch. A discussion of the application of the finite element method to the birdstrike problem is also presented. GRA

N84-26646# Dayton Univ., Ohio.

CURRENT PROBLEMS AND PROGRESS IN TRANSPARENCY IMPACT ANALYSIS c39

R. A. Brockman *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1057-1082 (For primary document see N84-26596 17-01)

(AD-P003233) Avail: NTIS HC A08/MF A01 CSCL 01/3

The design of aircraft transparencies for impact resistance poses a number of difficult problems for the structural analyst. Prominent among these are the accurate modeling of the transparency and its dynamic response, characterization of the construction materials, and evaluation of the applied loadings resulting from soft-body impact. This paper reviews current practices for mathematical modeling of transparency impacts, discusses problem areas in current analysis capabilities, and summarizes some current research on methods for impact simulation. GRA

N84-26647# Goodyear Aerospace Corp., Litchfield Park, Ariz.

NASTRAN ANALYSIS OF NUCLEAR EFFECTS ON HELICOPTER TRANSPARENCIES c39

P. T. Lin and J. S. Jorgenson *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1083-1095 (For primary document see N84-26596 17-01)

(AD-P003234) Avail: NTIS HC A08/MF A01 CSCL 01/3

This paper deals with the linear and geometric nonlinear analysis of the gunner's window on the AH-1S Cobra helicopter in response to a nuclear overpressure environment. The work was sponsored by the Applied Technology Laboratory, U.S. Army Research and Technology Laboratories (AVRADCOM), Fort Eustis, Virginia. Both monolithic stretched acrylic and multilayered transparency configurations are considered in this report. Comparison analyses using both the NASTRAN finite element program and classical Timoshenko plate theory show good agreement. Comparison of the analytical results with experimental observations made by other sources indicates that the geometric nonlinear mathematical models, rather than the linear models, are the more realistic and appropriate representation of transparency response to nuclear overpressure loading in the range considered. It is shown that the classical analysis of a simplified equivalent configuration serves as a useful checkpoint, while finite element programs, such as MSC/NASTRAN, are the necessary analytical tools to examine the complicated configurations and loading conditions. GRA

N84-26648# IFM Akustibyran A.B., Stockholm (Sweden).
THEORETICAL EVALUATION OF THE STRUCTURAL PERFORMANCE OF SWEDISH FIGHTER AIRCRAFT WINDSHIELDS SUBJECTED TO BIRD IMPACT **c03**
L. A. Samuelson, F. Nilsson, and L. Sornas *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1096-1131 (For primary document see N84-26596 17-01)
(AD-P003235) Avail: NTIS HC A06/MF A01 CSCL 01/3

High velocity bird impact characteristics were studied theoretically and the critical velocity, windshield deflection, birdraulics and associated phenomena in Swedish fighter aircraft were predicted. The investigation was carried out for the Swedish Air Force in close cooperation with the Saab Scania Aerospace Co. and the results were used to optimize the test program and to propose design improvements for existing crew enclosures. GRA

N84-26649# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.
STATUS OF NEW AEROTHERMODYNAMIC ANALYSIS TOOL FOR HIGH-TEMPERATURE RESISTANT TRANSPARENCIES **c39**
M. O. Varner and C. A. Babish *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1132-1157 (For primary document see N84-26596 17-01)
(Contract F33615-81-C-3412)
(AD-P003236) Avail: NTIS HC A06/MF A01 CSCL 01/3

This paper summarizes the status of the definition, selection, modification, and development of a Specific Thermal Analyzer Program for Aircraft Transparencies (STAPAT). The code developed will merge state-of-the-art technology, code accuracy requirements, and the definition of code function requirements resulting in an aerothermodynamic analytical technique that is specifically applicable and limited to the study of high-temperature resistant transparencies for high-speed aircraft. The aerothermodynamic methodologies required for the definition of the convective heat-load requirements of the STAPAT are described. These include the identification of inviscid methodologies covering the subsonic-to-supersonic-speed flight regime complex three-dimensional configurations consisting of real canopy geometries. The external forced convection methodology is described which includes complex three-dimensional effects resulting from the circumferential and streamwise variation of the local heating loads, the forced convection heat transfer as influenced by wall-temperature effects and transition location, and variable-edge entropy effects. GRA

N84-26650# Air Force Systems Command, Bolling AFB, Washington, D.C.
GUIDE TO CANADIAN AEROSPACE RELATED INDUSTRIES
R. L. McKenney, Jr. and D. J. Pearson Mar. 1984 124 p
(AD-A140606; AFSC-TR-84-001) Avail: NTIS HC A06/MF A01 CSCL 13/8

This guide is a contracting source list of Canadian aerospace related industries to be used by USAF procurement offices, project engineers, and scientists. It provides company profiles, a company keyword index, and contact points for each company.
Author (GRA)

N84-26651# Applied Concepts Corp., Woodstock, Va.
INVESTMENT JUSTIFICATION OF ROBOTIC TECHNOLOGY IN AEROSPACE MANUFACTURING Interim Report, 1 Sep. 1983 - 20 Jan. 1984
J. A. Simpson 20 Jan. 1984 19 p
(Contract F33615-83-C-5080)
(AD-A140782; BRMC-83-5080-1) Avail: NTIS HC A02/MF A01

This report presents the results of Phase 1 of a three phase research program to develop a computerized economic analysis methodology appropriate for investment justification of robotics and flexible manufacturing systems (FMS) in aerospace manufacturing. Phase 1 surveyed methodologies for performing economic analyses of capital investments, and assessed their accuracy and supportability by Air Force contractors. The research concluded that the Tech Mod/IMIP computerized discounted cash flow model, recently promulgated by the Air Force, could be modified to perform economic analyses of specific robotics and FMS investment projects. This will require, in Phase 2, adding the capability to the model to assess alternative robotics and FMS investment projects with different performance characteristics. A need was also identified for an investment analysis methodology with the capability to assess robotics/FMS projects based upon both economic and non-economic factors. GRA

N84-26652# Joint Publications Research Service, Arlington, Va.
USSR REPORT: TRANSPORTATION
5 Jun. 1984 76 p Transl. into ENGLISH from various Russian articles
(JPRS-UTR-84-016) Avail: NTIS HC A05/MF A01

Various aspects of transportation in the Soviet Union are discussed. Civil aviation, motor vehicles and highways, rail transportation, maritime shipping, and port facilities are reviewed. For individual titles, see N84-26653 through N84-26653.

N84-26653# Joint Publications Research Service, Arlington, Va.
ACHIEVEMENTS OF KAMOV HELICOPTER DESIGN BUREAU
S. V. Mikheyev *In its* USSR Rept.: Transportation (JPRS-UTR-84-016) 5 Jun. 1984 p 1-4 Transl. into ENGLISH from Grazhdanskaya Aviats. (Moscow), no. 2, Feb. 1984 p 34-35 (For primary document see N84-26652 17-01)
Avail: NTIS HC A05/MF A01

The Kamov series helicopters designed and produced in the Soviety Union for civil aviation purposes are discussed. Helicopter design, performance capabilities, aerial reconnaissance, and control are addressed. Ice reconnaissance is emphasized. R.S.F.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N84-26654 Illinois Inst. of Tech., Chicago.
CONTROL OF SEPARATED FLOWFIELDS USING FORCED UNSTEADINESS Ph.D. Thesis
Dennis Jay Koga 1983 274 p
Avail: Univ. Microfilms Order No. DA8405625

Locally introduced unsteady vorticity is capable of manipulating the separated flow region and its reattachment characteristics. This is achieved using a model unsteady separated flow field generated by a computer controlled, variable waveform spoiler like flap in a flat plate turbulent boundary layer with and without upstream separation. The generation of local unsteady flow vorticity and the management of separated flow regions are investigated utilizing smoke wire flow visualization, surface pressure measurements and multiprobe hot wire velocity mapping techniques. Local lifting surface mean pressure coefficient increases of nearly one hundred percent and a reduction of flow reattachment lengths to thirty percent of the natural steady flow separation cases are shown. Dissert. Abstr.

N84-26655 Purdue Univ., Lafayette, Ind.
TRANSONIC AEROELASTIC STABILITY AND RESPONSE OF CONVENTIONAL AND SUPERCRITICAL AIRFOILS INCLUDING ACTIVE CONTROLS Ph.D. Thesis
John Terence Batina 1983 191 p
Avail: Univ. Microfilms Order No. DA8407506

Transonic aeroelastic stability and response analyses are performed for two conventional airfoils, NACA 64A006 and NACA 64A010, and one supercritical airfoil, MBB A-3. Three d.o.f.'s are considered: plunge, pitch, and aileron pitch. A set of aeroelastic parameters are selected for which the flutter speeds are near the bottom of a transonic dip. A Pade' state-space aeroelastic model is formulated using genaralized aerodynamic forces approximated by an interpolating function in the variables. The coefficient matrices

of this function are determined by a least-squares curve fit of harmonic transonic aerodynamic data. Three sets of aerodynamic data are computed using three different transonic computational codes (LTRAN2-NLR, LTRAN2-HI, and USTS) for comparison purposes. In general, the Pade' interpolating function provides a good approximation of the unsteady aerodynamic coefficients predicted by the transonic codes. The state-space aeroelastic model, formulated by using the Pade' interpolating function, results in a set of linear, first-order, constant coefficient, different equations. Dissert. Abstr.

N84-26656 Kansas Univ., Lawrence.
DEVELOPMENT OF A THERMAL AND STRUCTURAL MODEL FOR A NASTRAN FINITE-ELEMENT ANALYSIS OF A HYPERSONIC WING TEST STRUCTURE Ph.D. Thesis
Jaap Lameris 1983 281 p
Avail: Univ. Microfilms Order No. DA8403708

As part of NASA's continuing research program into hypersonics, Drygen Flight Research Facility has conducted extensive heating and mechanical tests on a Hypersonic Wing Test Structure (HWTS). This structure was based on a structural concept developed for a hypersonic research airplane that would cruise at Mach 8. For future designs of structural concepts and space transportation systems operating at high temperatures, accurate prediction methods of thermal deflections and strains are required. An accurate prediction of the temperature distribution is a major prerequisite for obtaining this goal. In this context, the goal of NASA Dryden's HWTS project is to perform a coordinated analysis and test of a medium-sized existing specimen to obtain a detailed evaluation of state-of-the-art predictive techniques for thermal structures. This report describes the development of a thermal and structural model for this HWTS structure using the NASTRAN finite-element method as its primary analytical tool. A detailed analysis was defined to obtain the temperature and thermal stress distribution in the whole wing as well as at the five upper and lower root panels. Dissert. Abstr.

N84-26657 Cornell Univ., Ithaca, N.Y.
CALCULATION OF TRANSONIC POTENTIAL FLOW PAST WING-TAIL-FUSELAGE CONFIGURATIONS USING THE MULTIGRID METHOD Ph.D. Thesis
Arvin Shmilovich 1984 175 p
Avail: Univ. Microfilms Order No. DA8407377

A computer program for calculating transonic potential flow fields about three-dimensional wing-tail-fuselage configurations has been developed. Such computations provide insight into the nature of the flow patterns for closely-coupled multi-wing systems in cases for which flow analyses of the individual components in isolation (say, wing-body and tail-body combinations) can not be expected to be adequate for realistic modeling. An efficient procedure has been devised for generating boundary conforming coordinate systems for wing-tail-body configurations. A sequence of conformal and shearing transformations is employed to yield a slotted and nearly orthogonal computational domain. The analysis has been extended to construct body fitted grids for combinations which have an empennage consisting of twin vertical fins as well as twin horizontal tails. Computational grids for several existing aircraft have been used to demonstrate the ability of the mesh generation module to treat lifting surfaces of arbitrary planform and location. The possibility of constructing meshes for other multiple-component aircraft has also been investigated.
Dissert. Abstr.

N84-26658 Georgia Inst. of Tech., Atlanta.
A NUMERICAL ANALYSIS FOR BLADE TIP LOADINGS ON A THICK BLADED HOVERING HELICOPTER ROTOR Ph.D. Thesis
Thomas Changju Wey 1983 187 p
Avail: Univ. Microfilms Order No. DA8405607

An iterative vortex panel method and a simple model for vortex/surface interaction have been developed here to predict the pressure and the velocity distributions over a thick-blade rotor. The whole rotor system is represented by a system of vortices. It includes a bound vortex, a wake vortex system and a freestream vortex. The bound vortex consists of spanwise and chordwise vortex sheets on the blade surface. The wake vortex system is composed of an inner wake vortex sheet, a far-field tip vortex and a near-field tip vortex. The far-field tip vortex geometry is prescribed from experiments. The linear wake vortex sheet and a first approximation to the blade bound vorticity distribution are computed using a lifting line theory. The near-field tip vortex is computed by imposing the force-free condition. A new set of vorticity values on the blade surface are obtained by computing the tangential velocity induced at the mid-point of each panel on the surface. Dissert. Abstr.

N84-26659 New York Univ., New York.
THE METHOD OF COMPLEX CHARACTERISTICS FOR DESIGN OF TRANSONIC COMPRESSORS Ph.D. Thesis
Margaret Randolph Bledsoe 1983 190 p
Avail: Univ. Microfilms Order No. DA8405755

Shockless transonic flows past two-dimensional cascades of airfoils characterized by a prescribed speed distribution were calculated. Solutions for a partial differential equation describing transonic flow were determined by the method of complex characteristics. Analytic continuation, conformal mapping, and a spectral method in the hodograph plane were used to investigate the flow. The computational methods were utilized in a computer code to design two-dimensional cascades of shockless compressor airfoils with gap-70-choird ratios as low as 0.5 and supersonic zones on both the upper and lower surfaces. The complex characteristics method may be extended to solve more general boundary value problems for second order partial differential equations in two independent variables. Dissert. Abstr.

N84-26660*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NATURAL LAMINAR FLOW EXPERIMENTS ON MODERN AIRPLANE SURFACES
Bruce J. Holmes, Clifford J. Obara (Kentron International, Inc., Hampton, Va.), and Long P. Yip Jun. 1984 145 p refs
(NASA-TP-2256; L-15552; NAS 1.60:2256) Avail: NTIS HC A07/MF A01 CSCL 01A

Flight and wind-tunnel natural laminar flow experiments have been conducted on various lifting and nonlifting surfaces of several airplanes at unit Reynolds numbers between 0.63 x 10 to the 6th power/ft and 3.08 x 10 to the 6th power/ft, at Mach numbers from 0.1 to 0.7, and at lifting surface leading-edge sweep angles from 0 deg to 63 deg. The airplanes tested were selected to provide relatively stiff skin conditions, free from significant roughness and waviness, on smooth modern production-type airframes. The observed transition locations typically occurred downstream of the measured or calculated pressure peak locations for the test conditions involved. No discernible effects on transition due to surface waviness were observed on any of the surfaces tested. None of the measured heights of surface waviness exceeded the empirically predicted allowable surface waviness. Experimental results consistent with spanwise contamination criteria were observed. Large changes in flight-measured performance and stability and control resulted from loss of laminar flow by forced transition. Rain effects on the laminar boundary layer caused stick-fixed nose-down pitch-trim changes in two of the airplanes tested. No effect on transition was observed for flight through low-altitude liquid-phase clouds. These observations indicate the importance of fixed-transition tests as a standard flight testing procedure for modern smooth airframes. B.W.

N84-26661*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Dept. of Aeronautics and Astronautics.
AERODYNAMIC DESIGN USING NUMERICAL OPTIMIZATION
Earl M. Murman and Gary T. Chapman Cambridge, Mass. MIT Feb. 1983 34 p refs Submitted for publication
(Grant NAG2-115)
(NASA-TM-85550; NAS 1.15:85550; CFDL-TR-83-2) Avail: NTIS HC A03/MF A01 CSCL 01A

The procedure of using numerical optimization methods coupled with computational fluid dynamic (CFD) codes for the development of an aerodynamic design is examined. Several approaches that replace wind tunnel tests, develop pressure distributions and derive designs, or fulfill preset design criteria are presented. The method of Aerodynamic Design by Numerical Optimization (ADNO) is described and illustrated with examples. M.A.C.

N84-26662*# Vought Corp., Dallas, Tex.
ADVANCED PREDICTION TECHNIQUE FOR THE LOW SPEED AERODYNAMICS OF V/STOL AIRCRAFT. VOLUME 1: TECHNICAL DISCUSSION Final Report, Mar. 1982 - Mar 1983
T. D. Beatty and M. K. Worthey 15 Mar. 1984 148 p 2 Vol.
(Contract NAS2-11156)
(NASA-CR-166442-Vol-1; NAS 1.26:166442-Vol-1;
Rept-2-55110/3R-53463-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 01A

The V/STOL Aircraft Propulsive Effects (VAPE) computerized prediction method is evaluated. The program analyzes viscous effects, various jet, inlet, and Short TakeOff and Landing (STOL) models, and examines the aerodynamic configurations of V/STOL aircraft. M.A.C.

N84-26663*# Vought Corp., Dallas, Tex.
ADVANCED PREDICTION TECHNIQUE FOR THE LOW SPEED AERODYNAMICS OF V/STOL AIRCRAFT. VOLUME 2: USER'S MANUAL Final Report, Mar. 1982 - Mar. 1983
T. D. Beatty and M. K. Worthey 15 Mar. 1984 127 p 2 Vol.
(Contract NAS2-11156)
(NASA-CR-166442-Vol-2; NAS 1.26:166442-Vol-2;
Rept-2-55110/3R-53463-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 01A

A computerized prediction method known as the Vought V/STOL Aircraft Propulsive Effects computer program (VAPE) for propulsive induced forces and moments in transition and Short TakeOff and Landing (STOL) flight is improved and evaluated. The VAPE program is capable of evaluating: (1) effects of relative wind about an aircraft, (2) effects of propulsive lift jet entrainment, vorticity and flow blockage, (3) effects of engine inlet flow on the aircraft flow field, (4) engine inlet forces and moments including inlet separation, (5) ground effects in the STOL region of flight, and (6) viscous effects on lifting surfaces. M.A.C.

N84-26664*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPUTATIONAL METHOD FOR VISCOUS INCOMPRESSIBLE FLOWS
Dochan Kwak and James L. C. Chang (Rockwell International, Canoga Park, Calif.) May 1984 15 p refs
(NASA-TM-85958; A-9748; NAS 1.15:85958) Avail: NTIS HC A02/MF A01 CSCL 01A

An implicit, finite-difference procedure for numerically solving viscous incompressible flows is presented. The pressure-field solution is based on the pseudocompressibility method in which a time-derivative pressure term is introduced into the mass-conservation equation to form a set of hyperbolic equations. The pressure-wave propagation and the spreading of the viscous effect is investigated using simple test problems. Computed results for external and internal flows are presented to verify the present method which has proved to be very robust in simulating incompressible flows. Author

N84-26665*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPATIAL DERIVATIVES OF FLOW QUANTITIES BEHIND CURVED SHOCKS OF ALL STRENGTHS
Christine M. Darden Jul. 1984 32 p refs
(NASA-TM-85782; L-15778; NAS 1.15:85782) Avail: NTIS HC A03/MF A01 CSCL 01A

Explicit formulas in terms of shock curvature are developed for spatial derivatives of flow quantities behind a curved shock for two-dimensional inviscid steady flow. Factors which yield the equations indeterminate as the shock strength approaches 0 have been cancelled analytically so that formulas are valid for shocks of any strength. An application for the method is shown in the solution of shock coalescence when nonaxisymmetric effects are felt through derivatives in the circumferential direction. The solution of this problem requires flow derivatives behind the shock in both the axial and radial direction. Author

N84-26666*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A SOLUTION PROCEDURE FOR THREE-DIMENSIONAL INCOMPRESSIBLE NAVIER-STOKES EQUATION AND ITS APPLICATION
Dochan Kwak, James L. C. Chang (Rockwell International, Canoga Park, Calif.), and Samuel P. Shanks (Rockwell International, Canoga Park, Calif.) Jun. 1984 8 p refs
(NASA-TM-85978; A-9801; NAS 1.15:85978) Avail: NTIS HC A02/MF A01 CSCL 01A

An implicit, finite-difference procedure is presented for numerically solving viscous incompressible flows. For convenience of applying the present method to three-dimensional problems, primitive variables, namely the pressure and velocities, are used. One of the major difficulties in solving incompressible flows that use primitive variables is caused by the pressure field solution method which is used as a mapping procedure to obtain a divergence-free velocity field. The present method is designed to accelerate the pressure-field solution procedure. This is achieved by the method of pseudocompressibility in which the time derivative pressure term is introduced into the mass conservation equation. The pressure wave propagation and the spreading of the viscous effect is investigated using simple test problems. The present study clarifies physical and numerical characteristics of the pseudo-compressible approach in simulating incompressible flows. Computed results for external and internal flows are presented to verify the present procedure. The present algorithm has been shown to be very robust and accurate if the selection of the pseudo-compressibility parameter has been made according to the guidelines given. M.G.

N84-26667*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LOW-SPEED INVESTIGATION OF EFFECTS OF WING LEADING- AND TRAILING-EDGE FLAP DEFLECTIONS AND CANARD INCIDENCE ON A FIGHTER CONFIGURATION EQUIPED WITH A FORWARD-SWEPT WING
Thomas G. Gainer, Michael J. Mann, and Jarrett K. Huffman Jul. 1984 51 p refs
(NASA-TM-85795; L-15746; NAS 1.15:85795) Avail: NTIS HC A04/MF A01 CSCL 01A

An advanced fighter configuration with a forward-swept wing of aspect ratio 3.28 is tested in the Langley 7 by 10 Foot High Speed Tunnel at a Mach number of 0.3. The wing has 29.5 degrees of forward sweep of the quarter chord line and is equipped with 15 percent chord leading edge and 30 percent chord trailing edge flaps. The canard is sweptback 45 degrees. Tests were made through a range of angle of attack from about -2 degrees to 22 degrees. Deflecting the flaps significantly improves the lift drag characteristics at the higher angles of attack. The canard is able to trim the configurations with different flap deflections over most of the range of angle of attack. The penalty in maximum lift coefficient due to trimming is about 0.10. M.A.C.

N84-26668*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CALCULATION OF VERTICAL AND RAMP-ASSISTED TAKEOFFS FOR SUPERSONIC CRUISE FIGHTERS
Grace C. Liu Jun. 1984 32 p refs
(NASA-TM-85818; NAS 1.15:85818) Avail: NTIS HC A03/MF A01 CSCL 01A

A procedure that allows rapid preliminary evaluations of the vertical, short, and normal takeoff performance of supersonic cruise aircraft concepts was developed into a numerical computer program. The program is used to determine the effects on takeoff performance of various parameters, such as thrust-weight ratio,

wing loading, thrust vector angle, and flap setting. Ramp-assisted takeoffs for overloaded configurations typical of a ground-attack mission are included. The effects of wind on the takeoff performance are also considered. Author

N84-26669*# University Coll. of Swansea (Wales). Inst. for Numerical Methods in Engineering.
AN ADAPTIVE FINITE ELEMENT METHOD FOR HIGH SPEED COMPRESSIBLE FLOW
R. Loehner, K. Morgan, and O. C. Zienkiewicz Jun. 1984 7 p refs Presented at the 9th Intern. Conf. on Numerical Methods in Fluid Dyn., Paris, Jun. 1984
(Grant NAGw-478)
(NASA-CR-173443; NAS 1.26:173443; C/R/479/84) Avail: NTIS HC A02/MF A01 CSCL 01A

Compressible fluid problems were solved using an adaptive finite element method. Supersonic flow past a wedge and Prandtl-Meyer expansion were considered. Computational grids are presented. R.S.F.

N84-26670# Calspan Advanced Technology Center, Buffalo, N.Y.
STUDIES OF BOUNDARY LAYER TRANSITION AND SURFACE ROUGHNESS EFFECTS IN HYPERSONIC FLOW Final Report, 1 Nov. 1978 - 30 Sep. 1982
M.S. Holden Oct. 1983 160 p. (Contract F49620-79-C-0003; AF Proj. 2307) (AD-A140803; CALSPAN-6430-A-5; AFOSR-84-0251TR) Avail: NTIS HC A08/MF A01 CSCL 20/4

The fluid mechanics by which the laminar-turbulent boundary becomes unstable in high speed boundary layers were studied. Studies included: (1) the relationship between roughness-element shape and spacing and the heating and skin friction induced by surface roughness; (2) the transition process in the stagnation region of a blunt body in hypersonic flow; (3) the influence of transition, surface roughness in the stagnation region, and minute dust particles on the shock layer ahead of a blund body; and (4) microsecond photographs and thin film measurements on slender cones to examine the breakdown in flow in and preceding the hypersonic boundary layer transition region. GRA

N84-26671# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INTERNATIONAL AVIATION (SELECTED ARTICLES)
G. Ruizhang and Z. Xuexun 18 Apr. 1984 21 p Transl. into ENGLISH from Guoji Hangkong (China), no. 237, 23 Nov. 1982 p 2-5
(AD-A140895; FTD-ID(RS)T-0041-84) Avail: NTIS HC A02/MF A01 CSCL 20/4

The aerodynamic drag was assessed for the Y-11 agricultural aircraft model on which was installed wing tip sails. The results of low-speed wind tunnel tests are reported. The effect of the sails on lift and drag characteristics is presented. In addition, the contents of an aerodynamic handbook are reviewed. Aerodynamic calculations and symbols along with a discussion of aircraft wing and fuselages are included therein. R.S.F.

N84-26672# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
A QUASI-SIMULTANEOUS CALCULATION METHOD FOR STRONGLY INTERACTING VISCOUS FLOW AROUND AN INFINITE SWEPT WING
A. E. P. Veldman and J. P. F. Lindhout 3 Jan. 1983 8 p refs Presented at 2nd Symp. on Numerical and Phys. Aspects of Aerodyn. Flows, Long Beach, Calif., 17-20 Jan. 1983
(Contract NIVR-1865)
(NLR-MP-83001-U; AD-B082665) Avail: NTIS HC A02/MF A01

A code, called VISIAN, for the analysis of aerodynamic flows with strong viscous-inviscid interaction is presented. The code is based on quasi-simultaneous methods for the calculation of strongly interacting boundary layers. The numerical algorithm with which the viscous and inviscid flow region are coupled; the modeling of the flow in the viscous region, especially in the regions of strong interaction; and the informatics structure of the code are discussed. Author (ESA)

N84-26673# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
INTEGRATING MULTIGRID RELAXATION INTO A ROBUST FAST-SOLVER FOR TRANSONIC POTENTIAL FLOWS AROUND LIFTING AIRFOILS
J. W. Boerstoel and A. Kassies 28 Apr. 1983 18 p refs Presented at 6th AIAA Computational Fluid Dyn. Conf., Danvers, Mass., 13-15 Jul. 1983
(Contract NIVR-1853)
(NLR-MP-83021-U) Avail: NTIS HC A02/MF A01

A robust fast-solver for the calculation of transonic potential flows around lifting airfoils, a combination of Newton iteration and correction scheme multigrid relaxation is presented. This combination allows a simpler analysis of convergence properties than the full approximation storage multigrid relaxation that is usually applied. The circulation in the asymptotic far field solution is computed by a procedure based on Newton iteration applied to the Kutta condition. In order to exclude expansion shock and to reduce artificial viscosity in shocks and the associated stiffness effects, upwinding based on mass-flux-vector splinting was introduced. Velocity overshoots and corresponding potential jumps at shocks are allowed. The algorithm can compute subsonic and transonic potential flows around lifting airfoils in 8 to 25 work units. Author (ESA)

N84-26674# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
TRANSONIC PANEL METHOD FOR THE FULL POTENTIAL EQUATION APPLIED TO MULTI-COMPONENT AIRFOILS
B. Oskam 31 May 1983 14 p refs Presented at 6th AIAA Computational Fluid Dyn. Conf., Danvers, Mass., 13-15 Jul 1983
(Contract NIVR-1866)
(NLR-MP-83030-U) Avail: NTIS HC A02/MF A01

The panel method is extended to obtain numerical solutions of the full potential equation for transonic flow by adding a field distribution of source singularities to the conventional distribution of singularities over the boundaries of the field. The unknown source distribution in the field is determined by solving the full potential equation, written as mass conservation law and approximated by the fully-conservative finite volume technique. Shock waves are captured automatically by splitting the transformed flux components, and applying upwind-differencing to the monotonic, supersonic parts. The transonic panel method reduces the computational domain to those parts of the flow field where the nonlinear compressibility effects are nonnegligible. The method is tested by computing the potential flow over single and multi-component airfoils. Author (ESA)

N84-26675# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
HALF-MODEL TESTING IN THE NLR HIGH SPEED TUNNEL (HST): ITS TECHNIQUE AND APPLICATION
S. J. Boersen and A. Elsenaar 15 Jul. 1983 19 p refs Presented at AGARD Fluid Dyn. Panel Symp. on Wind Tunnels and Testing Tech., Cesme, Turkey, 26-29 Sep. 1983
(NLR-MP-83036-U) Avail: NTIS HC A02/MF A01

The half-model test technique based on a systematic comparison of half-model test results with the corresponding full-model data is evaluated. It is shown that the most important problems with this technique originate from half-model mounting and wall interference effects. These effects can only be determined empirically using the full-model test results as a reference. It can then be shown that the pressure distribution on the wing and the off-design boundaries are well represented in the half-model tests. Applications of this technique, in which half-model test results are used on a relative basis, are presented. Author (ESA)

N84-26820# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
V. V. Bolotin and B. P. Simonov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 46 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 149-156 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26914# Joint Publications Research Service, Arlington, Va.
ANALYTICAL DESCRIPTION OF HYPERSONIC GAS JET DISCHARGED INTO MOTIONLESS MEDIUM OR INTO SUPERSONIC COMPANION STREAM Abstract Only
M. M. Gilinskiy and L. I. Zak *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 21 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 183-186 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26915# Joint Publications Research Service, Arlington, Va.
AERODYNAMIC AND THERMAL CHARACTERISTICS OF 3-DIMENSIONAL STELLATE BODIES IN RAREFIED GAS Abstract Only
A. I. Bunimovich and V. I. Kuzmenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 21-22 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 181-183 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26917# Joint Publications Research Service, Arlington, Va.
INTERACTION OF JET DISCHARGED FROM CONTAINER AND OPPOSING SUPERSONIC STREAM OF RAREFIED GAS Abstract Only
I. N. Larina *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 132-137 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26918# Joint Publications Research Service, Arlington, Va.
METHOD OF CALCULATING STRONG VISCOUS INTERACTION AT DELTA WING Abstract Only
G. I. Dudin and D. O. Lyzhin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 25 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 119-124 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26919# Joint Publications Research Service, Arlington, Va.
MIXED BOUNDARY-VALUE PROBLEMS PERTAINING TO PROFILE OF SUPERSONIC NOZZLES AND CHANNELS Abstract Only
A. S. Boynovskiy and V. I. Kireyev *In its* USSR Rept.: Eng. and Equipment (JPRS)-UEQ-84-003) 13 Apr. 1984 p 25-26 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 83 p 112-118 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26922# Joint Publications Research Service, Arlington, Va.
INTERACTION OF AIR SHOCK WAVES AND POROUS SHIELD Abstract Only
B. Ye. Gelfand, A. V. Gubanov, and Ye. I. Timofeyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1983 p 27-28 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 79-84 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26923# Joint Publications Research Service, Arlington, Va.
AERODYNAMICS OF HOVERING Abstract Only
A. A. Zaytsev and L. V. Sharina *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1983 p 28 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 71-78 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26925# Joint Publications Research Service, Arlington, Va.
EFFECT OF INJECTION INTO BOUNDARY LAYER ON FLOW OF SUPERSONIC STREAM PAST OSCILLATING CONE Abstract Only
Ye. S. Korniyenko and V. N. Shmanenikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 29 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 43-46 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26928# Joint Publications Research Service, Arlington, Va.
SUPERSONIC THREE-DIMENSIONAL JET FLOW IN CHANNEL Abstract Only
A. V. Antsupov and A. V. Shuynov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 31 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 155-159 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26929# Joint Publications Research Service, Arlington, Va.
SEPARATION FLOW OF TRANSSONIC WATER STREAM PAST CIRCULAR CONE Abstract Only
G. A. Alyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 32 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 152-154 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26933# Joint Publications Research Service, Arlington, Va.
SEPARATION FLOW AT CONCAVE CONICAL WINGS Abstract Only
V. V. Kravets and A. I. Shvets *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 34-35 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 83-91 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26937# Joint Publications Research Service, Arlington, Va.
INTERACTION OF TURBULENT BOUNDARY LAYER AND UPWARD DENSITY JUMP AT TRANSSONIC STREAM VELOCITIES Abstract Only
S. A. Velichko and Yu. B. Lifshits *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 37 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 32-38 (For primary document see N84-26895 17-32)
Avail: NTIS HC A04/MF A01

N84-26949# Joint Publications Research Service, Arlington, Va.
EFFECT OF ELASTICALLY SUSPENDED MASSES ON STABILITY OF ELASTIC PANELS IN SUPERSONIC STREAM Abstract Only

IN-FLIGHT MEASUREMENT OF PRESSURE DISTRIBUTION OVER T-38 STUDENT CANOPY
W. R. Pinnell *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 527-552 (For primary document see N84-26596 17-01)
(AD-P003207) Avail: NTIS HC A08/MF A01 CSCL 01/3

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N84-26676 British Aerospace Aircraft Group, Kingston-upon-Thames (England).
VORTEX LIFTED STONE INGESTION: THE INFLUENCE OF STONE DIAMETER
C. L. Bore 19 Apr. 1983 6 p refs
(BAe-KRS-N-GEN-276) Avail: Issuing Activity

Stone ingestion during aircraft engine run up is discussed. Mathematical relationships devised for experimental scaling rules are extended to cover the variations in height of stone trajectory with varying diameter. According to the formulas smaller stones can be thrown higher than large stones, but the variation is not very sensitive. Results accord with experiments. Author (ESA)

N84-26677 Royal Aircraft Establishment, Farnborough (England).
NOTE ON AN ACCIDENT TO THE BOULTON PAUL 120 VT 951 DELTA AIRCRAFT
Winfried Braun Mar. 1953 12 p
(RAE-Struct-Acc-248; RAE-Structs-A4/11183/WB) Avail: NTIS HC A02

The port elevon of the Prototype Boulton Paul Delta Aircraft 120, VT 951 broke off in flight. The cause of the detachment was flutter involving the elevon-tab or the wing-elevon-tab. Examination of the wreckage shows a lack of stiffness in the tab control mechanism. Author (ESA)

N84-26678 Royal Aircraft Establishment, Farnborough (England).
NOTE ON THE STRUCTURAL FAILURE OF HANDLEY PAGE 88 (E6/48) VX.330
A. J. Almond Jul. 1952 22 p
(RAE-Struct-Acc-245; RAE-Structs-A4/11129/AJA/109) Avail: NTIS HC A02

The Handley Page 88 prototype (E6/48) crashed following structural failure in the air. The aircraft disintegrated in level, or shallow diving, flight at low altitude and subsonic speed. Examination of the wreckage suggests that primary failure occurred in the fuselage. This failure is attributed to pitching oscillations. Author (ESA)

N84-26679*# Battelle Columbus Labs., Mountain View, Calif.
CLEARED FOR THE VISUAL APPROACH: HUMAN FACTOR PROBLEMS IN AIR CARRIER OPERATIONS
William P. Monan Sep. 1983 39 p refs
(Contract NAS2-10060)
(NASA-CR-166573; NAS 1.26:166573) Avail: NTIS HC A03/MF A01 CSCL 01C

The study described herein, a set of 353 ASRS reports of unique aviation occurrences significantly involving visual approaches was examined to identify hazards and pitfalls embedded in the visual approach procedure and to consider operational practices that might help avoid future mishaps. Analysis of the report set identified nine aspects of the visual approach procedure that appeared to be predisposing conditions for inducing or exacerbating the effects of operational errors by flight crew members or controllers. Predisposing conditions, errors, and operational consequences of the errors are discussed. In a summary, operational policies that might mitigate the problems are examined. Author

N84-26680# Federal Aviation Agency, Atlantic City, N.J.
EVALUATION OF AN IMPROVED FLAME RESISTANT AIRCRAFT WINDOW SYSTEM Final Report
George B. Geyer and Charles H. Urban May 1984 62 p refs
(FAA-CT-83-10) Avail: NTIS HC A04/MF A01

A series of representative fire modeling experiments of aircraft cabin window systems are conducted employing salvaged segments of a McDonnell Douglas DC 10 aircraft. Experiments are performed in which a thermally improved window system is installed adjacent to a standard window configuration and exposed to flame impingement. The thermally improved DC 10 window configuration, employing the stretched acrylic pressure pane and the EX 112 fail safe pane, provides an overall improvement in flame resistivity over the standard all acrylic window system of 79 seconds. The silicone rubber window gasket provides adequate thermal and mechanical stability toward preventing flame penetration into the cabin through the improved window system for 225 seconds. An improvement in fire resistivity of 51 seconds is obtained by the improved window configuration over the standard stretched acrylic window system. Comparative tests performed with representative DC 10 fuselage components employing the cabin interior honeycomb panel and the aluminum panel configurations, show that the honeycomb panel provides a minimum improvement in flame resistivity of 67 seconds over the aluminum interior panel. M.A.C.

N84-26681# Electra Mfg. Co., Independence, Kans.
AIRCRAFT SEAT FIRE BLOCKING LAYERS. EFFECTIVENESS AND BENEFITS UNDER VARIOUS SCENARIOS Final Report
R. G. Hill, L. J. Brown, L. Speitel, G. R. Johnson, and C. Sarkos Feb. 1984 165 p
(AD-A140796; FAA-CT-83-43) Avail: NTIS HC A08/MF A01 CSCL 01/2

Full-scale tests were conducted utilizing the C133 test article located in the Full-Scale Fire Test Facility to determine the benefits that could be derived from fire blocking aircraft passenger seats. Various fire scenarios were selected and tests conducted to evaluate the effectiveness of various blocking materials. The scenarios selected fell into three broad classifications, post-crash, inflight, and ramp type fires. Test results indicate that the use of a fire-blocking material could increase survivable evacuation time during a post-crash fire that enters a fuselage through a break in the cabin, by as much as 50 percent. Tests also indicate that in-flight and ramp type fires that could destroy the aircraft with present seating materials, could be controlled with the use of a fire-blocking material. Author (GRA)

N84-26682# Aeronautical Research Labs., Melbourne (Australia).
PROPOSED CRASHWORTHINESS REQUIREMENTS FOR THE AUSTRALIAN BASIC TRAINER
S. R. Sarrailhe Oct. 1983 41 p
(AD-A140850; ARL-STRUC-TM-366) Avail: NTIS HC A03/MF A01 CSCL 01/3

A proposal for the crashworthiness requirements for the Basic Trainer was prepared by ARL in response to a request from the RAAF. The requirements, which are based on existing standards, together with some subsequent interpretations and recommendations are collated in this technical memorandum. Author (GRA)

N84-26597# Space Ordnance Systems, Inc., Saugus, Calif.
PYROTECHNIC CLEAR PATH EGRESS SYSTEM FOR THE T-38 TRAINER AIRCRAFT
S. Phillips *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 2-24 (For primary document see N84-26596 17-01)
(AD-P003184) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26602# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
T-38 STUDENT WINDSHIELD BIRDPROOFING EFFORTS UTILIZING METAL AND COMPOSITE MATERIALS FOR AFT ARCH REINFORCEMENT
J. M. Schlueter *In* Dayton Univ. Conf. on Aerospace Transparent

Mater. and Enclosures Dec. 1983 p 108-133 (For primary document see N84-26596 17-01)
(AD-P003189) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26608# Materials Research Labs., Melbourne (Australia).
SERVICE-LIFE INDUCED FAILURE OF BIRD IMPACT RESISTANT WINDSHIELDS
P. J. Burchill and R. H. Stacewicz *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 238-259 (For primary document see N84-26596 17-01)
(AD-P003195) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26627# Civil Aviation Authority, Redhill (England). Airworthiness Div.
CIVIL AIRCRAFT WINDSCREEN DAMAGE DUE TO BIRDSTRIKES
J. Thorpe *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 658-676 (For primary document see N84-26596 17-01)
(AD-P003214) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26628# Air Force Engineering and Services Center, Tyndall AFB, Fla.
USAF AIRCRAFT WINDSHIELD/CANOPY BIRD STRIKES
R. C. Kull *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 677-689 (For primary document see N84-26596 17-01)
(AD-P003215) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26629# Royal Netherlands Air Force, Volkel.
INCREASING BIRDSTRIKE RATES AND IMPROVED BIRDSTRIKE ANALYSIS OF THE ROYAL NETHERLANDS AIR FORCE
L. S. Buurma *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 690-715 (For primary document see N84-26596 17-01)
(AD-P003216) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26630# Saab-Scania, Linkoping (Sweden). Aerospace Div.
INVESTIGATIONS CONCERNING IMPROVEMENTS OF THE SAAB 37 WINDSHIELD BIRDSTRIKE RESISTANCE
B. P. Fonden and K. I. Persson *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 717-729 (For primary document see N84-26596 17-01)
(AD-P003217) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26631# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
BIRD IMPACT EVALUATION OF THE F/RF-4 TRANSPARENCY SYSTEM
R. Simmons and G. J. Stenger *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 730-755 (For primary document see N84-26596 17-01)
(AD-P003218) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26648# IFM Akustibyran A.B., Stockholm (Sweden).
THEORETICAL EVALUATION OF THE STRUCTURAL PERFORMANCE OF SWEDISH FIGHTER AIRCRAFT WINDSHIELDS SUBJECTED TO BIRD IMPACT
L. A. Samuelson, F. Nilsson, and L. Sornas *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1096-1131 (For primary document see N84-26596 17-01)
(AD-P003235) Avail: NTIS HC A08/MF A01 CSCL 01/3

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N84-26683# Lincoln Lab., Mass. Inst. of Tech., Lexington.
AIR-TO-AIR MODE S SURVEILLANCE ALGORITHM
P. H. Mann 10 Feb. 1982 39 p refs
(Contract DOT-FA72WAI-261)
(FAA-RD-81-71) Avail: NTIS HC A03/MF A01

Lincoln Laboratory is assisting the Federal Aviation Administration in developing a beacon based airborne collision avoidance system known as the Traffic Alert and Collision Avoidance System (TCAS). The version of TCAS intended for air carrier use is called TCAS II. It provides traffic and resolution advisories and operates in the highest traffic densities predicted for the end of the century. TCAS II extends and replaces an earlier system known as BCAS (for Beacon Collision Avoidance System). Mode S surveillance algorithms developed for BCAS are described in this report. These algorithms form the basis for TCAS algorithms now under development at Lincoln Laboratory. Author

N84-26684# Electronics Research Lab., Adelaide (Australia).
A SEABORNE NAVIGATION TRIAL UTILISING A DIFFERENTIAL OMEGA SYSTEM
J. H. Silby Dec. 1983 32 p refs
(ERL-0295-TM; AR-003-733) Avail: NTIS HC A03/MF A01

A sea trial was conducted to test the accuracy of the Differential Omega navigation system at sea and to compare the results with those obtained on land. Position measuring equipment utilizing the Differential Omega system was set up on board ship and positions obtained by the Differential Omega system were compared with those obtained by the Argo system. The exercise and the results obtained are discussed herein. There appears to be a marked decrease in navigational accuracy during the night caused by ionospheric decorrelation. R.S.F.

N84-26685*# Research Triangle Inst., Research Triangle Park, N.C. Center for Systems Engineering.
EFFECTS OF AIRCRAFT AND FLIGHT PARAMETERS ON ENERGY-EFFICIENT PROFILE DESCENTS IN TIME-BASED METERED TRAFFIC
Fred R. Dejarnette Jun. 1984 72 p refs
(Contract NAS1-17023)
(NASA-CR-172338; NAS 1.26:172338; RTI/2467) Avail: NTIS HC A04/MF A01 CSCL 17G

Concepts to save fuel while preserving airport capacity by combining time based metering with profile descent procedures were developed. A computer algorithm is developed to provide the flight crew with the information needed to fly from an entry fix to a metering fix and arrive there at a predetermined time, altitude, and airspeed. The flight from the metering fix to an aim point near the airport was calculated. The flight path is divided into several descent and deceleration segments. Descents are performed at constant Mach numbers or calibrated airspeed, whereas decelerations occur at constant altitude. The time and distance associated with each segment are calculated from point mass equations of motion for a clean configuration with idle thrust. Wind and nonstandard atmospheric properties have a large effect on the flight path. It is found that uncertainty in the descent Mach number has a large effect on the predicted flight time. Of the possible combinations of Mach number and calibrated airspeed for a descent, only small changes were observed in the fuel consumed. E.A.K.

N84-26686# Defense Mapping Agency, Washington, D.C.
THE ELECTRONIC CHART Final Report

J. L. Hammer, III Apr. 1984 10 p
(AD-A140565) Avail: NTIS HC A02/MF A01 CSCL 17/7

All indications are that technology will lead mariners to seek newer and better ways to control their ships. By looking at some of the integrated navigation systems presently available, this paper attempts to look at the problems, some of the questions raised, and some rudimentary answers associated with the electronic chart. The subject is complex and there has not been enough public discussion to make any firm determinations. This paper is aimed at stimulating thought in an effort to get members of the hydrographic community to consider the electronic chart in their future planning. GRA

N84-26687# Defense Mapping Agency, Washington, D.C.
ERROR ANALYSIS FOR MARINE GEODETIC CONTROL USING THE GLOBAL POSITIONING SYSTEM Final Report
M. Kumar, P. J. Fell, A. VanMelle, and N. Saxena 9 Mar. 1984 18 p
(AD-A140566) Avail: NTIS HC A02/MF A01 CSCL 08/5

The Global Positioning System (GPS) provides a new capability for establishing marine control for moored ocean bottom transponders that support precise navigation of ships, instrument packages, and submersibles. Autonomous remotely deployed marine platforms ranging to GPS satellites, which can simultaneously be triggered to measure acoustical ranges to a transponder network, can be used to establish geodetic control for the transponder array. The technique takes advantage of a dynamically changing double pyramid which is formed between GPS satellites and the transponder array linked observationally by the remote platform. An error analysis is presented for an operational scenario where marine control is established in a deep ocean area. Several designs for this experiment are considered including the effect of constraint conditions. The results indicate that the establishment of precise ocean bottom control is obtainable using the GPS system with this approach. GRA

N84-26688# Defense Mapping Agency, Washington, D.C.
APPLICATIONS OF THE GPS (GLOBAL POSITIONING SYSTEM) GEODETIC RECEIVER SYSTEM Final Report
B. Hermann, A. G. Evans, R. W. Hill, S. Meyerhoff, and M. Sims 14 Mar. 1984 20 p
(AD-A140567) Avail: NTIS HC A02/MF A01 CSCL 08/5

The Defense Mapping Agency, in cooperation with the United States Geological Survey and the National Oceanic and Atmospheric Administration, is sponsoring the development of a Global Positioning System geodetic receiver (GEOSTAR). The receiver is capable of observing up to four satellites simultaneously by sampling segments of broadcast signals from different satellites in a time-multiplexing sense using a single dual frequency channel. The receiver system was designed to measure the geodetic coordinates of points to an accuracy of one meter and to provide first-order estimates of baselines of up to several hundred kilometers in length. In addition, the receiver can support positioning and attitude determination of geophysical survey platforms under low dynamic conditions. Descriptions of these applications are presented. GRA

N84-26689# Arinc Research Corp., Annapolis, Md.
EVALUATION OF STRATEGIES TO ENHANCE DEPARTURE SEQUENCING Final Report
D. Tillotson and K. Markin Mar. 1984 53 p
(Contract DTFA01-80-C-10030)
(AD-A140710; Rept-1378-11-9-3244; DOT/FAA/ES-84/1) Avail: NTIS HC A04/MF A01 CSCL 17/7

This report assesses a departure enhancement strategy that will reduce the delays caused by the departure sequence of a series of aircraft. Data were collected at three airports to characterize the existing delays caused by the first come, first served departure sequencing strategy. The data were then used to define a simple alternative departure sequencing strategy. The alternative strategy was evaluated to determine the benefits available from departure resequencing. The evaluations indicate that possible reductions in fuel usage and possible increases in airport capacity could be achieved. However, the estimated benefits are not of sufficient magnitude to recommend implementation of the proposed strategy. Author (GRA)

N84-26690# Electronic Systems Div., Hanscom AFB, Mass.
AN/TPN-19 IMPROVEMENTS PROGRAM MANAGEMENT PLAN
Feb. 1984 60 p
(AD-A140728) Avail: NTIS HC A04/MF A01 CSCL 17/7

The purpose of the AN/TPN-19 Landing Control Central (LCC) is to provide a modern, reliable, air transportable terminal area radar air traffic control system to perform effectively under conditions of heavy precipitation and high traffic density in support of world wide tactical operations. The AN/TPN-19 program resulted in the procurement of 11 systems: two prototypes refurbished to production configuration, and nine production units. The present program directs Air Force Systems Command (AFSC) to initiate a program to improve the operational effectiveness of the AN/TPN-19 LCC. Air Force logistics command (AFLC) is designated supporting command, Air Force communications command (AFCC) the operating command and Air Force operational test and evaluation center (AFOTEC) and Air training command (ATC the participating commands. GRA

N84-26691# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C. Hydrographic and Topographic Center.
NAVSTAR GLOBAL POSITIONING SYSTEM OVERVIEW Final Report
W. H. Wooden 10 Apr. 1984 21 p
(AD-A140793) Avail: NTIS HC A02/MF A01 CSCL 17/7

Currently, the GPS program is in the full-scale engineering and development phase. During this phase, a constellation of five to six satellites is being maintained to support testing so that the operational effectiveness of the GPS concept for both military and civilian users will be verified. The buildup of the operational constellation will begin in late 1986 and will take approximately two years to complete. Even though the system is not fully operational, several potential civilian applications exist. GRA

N84-26692# National Oceanic and Atmospheric Administration, Miami, Fla. Office of Aircraft Operations.
STUDY OF NOAA (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION) WP-3D TERMINAL NAVIGATION ERRORS BASED ON NAVIGATORS LOGBOOKS: 1977-1983
Francis J. Merceret Dec. 1983 68 p ref
(PB84-155738; NOAA/TM/OAO-2; NOAA-84020701) Avail: NTIS HC A04/MF A01 CSCL 17G

Terminal errors in position and ground speed as recorded in navigator's logbooks from the NOAA WP-3D aircraft are examined statistically. The effects of Omega aiding of the Inertial Navigation Equipment (INE) and the effects of mission length are determined. The behavior of particular units identified by serial number is examined along with secular trends in navigation accuracy. Author (GRA)

N84-26909# Joint Publications Research Service, Arlington, Va.
EQUATIONS OF SMALL OSCILLATIONS FOR INERTIAL NAVIGATION SYSTEM TAKING INTO ACCOUNT EARTH'S ELLIPSOIDALITY Abstract Only
Yu. K. Zhbanov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 17 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 51-56 (For primary document see N84-26895 17-31) Avail: NTIS HC A04/MF A01

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-26693*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

AN ANALYSIS OF ROTOR BLADE TWIST VARIABLES ASSOCIATED WITH DIFFERENT EULER SEQUENCES AND PRETWIST TREATMENTS

Kathy Alkire May 1984 41 p refs
(NASA-TM-84394; A-9507; NAS 1.15:84394) Avail: NTIS HC A03/MF A01 CSCL 01C

A nonlinear analysis which is necessary to adequately model elastic helicopter rotor blades experiencing moderately large deformations was examined. The analysis must be based on an appropriate description of the blade's deformation geometry including elastic bending and twist. Built-in pretwist angles complicate the deformation process ant its definition. Relationships between the twist variables associated with different rotation sequences and corresponding forms of the transformation matrix are lasted. Relationships between the twist variables associated with first, the pretwist combined with the deformation twist are included. Many of the corresponding forms of the transformation matrix for the two cases are listed. It is shown that twist variables connected with the combined twist treatment are related to those where the pretwist is applied initially. A method to determine the relationships and some results are outlined. A procedure to evaluate the transformation matrix that eliminates the Eulerlike sequence altogether is demonstrated. The resulting form of the transformation matrix is unaffected by rotation sequence or pretwist treatment.
E.A.K.

N84-26694# Swedlow, Inc., Garden Grove, Calif.
MONOLITHIC F-16 UNIFORM THICKNESS STRETCHED ACRYLIC CANOPY TRANSPARENCY PROGRAM Final Technical Report, Sep. 1982 - Sep. 1983

R. Hopkins Wright-Patterson AFB, Ohio AFWAL Jan. 1984 47 p
(Contract F33615-81-C-3416; AF Proj. 1926)
(AD-A140645; AFWAL-TR-84-3018) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report documents the successful efforts to manufacture a subscale stretched acrylic canopy transparency of near uniform thickness. The report also provides the results of high temperature acrylic tensile tests, simple geometry forming tests and finite element computer models. Author (GRA)

N84-26695# Army Aviation Engineering Flight Activity, Edwards AFB, Calif.
PRELIMINARY AIRWORTHINESS EVALUATION OF THE RUTAN AIRCRAFT FACTORY (RAF), INCORPORATED LONG-EZ AIRPLANE Final Report, 14 Jan. - 1 Apr. 1983

V. L. Diekmann, D. L. Underwood, R. N. Ward, and M. Graham Jun. 1983 162 p
(AD-A140765; USAAEFA-82-18) Avail: NTIS HC A08/MF A01 CSCL 01/3

The U.S. Army Aviation Engineering Flight Activity conducted a Preliminary Airworthiness Evaluation of the Rutan Aircraft Factory, Inc. designed LONG-EZ airplane at Edwards AFB, Calif. During the test program 34 flights were conducted for a total of 32.0 hours, of which 24.5 were productive. The objectives of the evaluation were to assess the performance and handling qualities of the LONG-EZ so that the US Army Aviation Research and Development Command could issue an airworthiness release for concept feasibility evaluation of the aircraft. The test aircraft exhibited excellent potential for the light observation/reconnaissance mission and is satisfactory for the intended concept feasibility evaluation. The high availability and minimal maintenance down time due to ease of repair of composite structures during flight testing of the LONG-EZ were noteworthy. One deficiency and fifteen shortcomings were identified. The loss of directional control due to single point brake failure during take-off/landing and ground handling was identified as a deficiency and is a safety-of-flight hazard. The major shortcomings affecting mission versatility and pilot effectiveness were: decrease in engine power during low g maneuvers; limited directional control; excessive throttle freeplay; limited longitudinal trimmability; and inaccessability of the lateral trim system. The deficiency should be corrected if development continues. The shortcomings should be corrected prior to production. GRA

N84-26696# Army Aviation Engineering Flight Activity, Edwards AFB, Calif.
PRELIMINARY AIRWORTHINESS EVALUATION OF THE UH-60 HELICOPTER WITH T700-GE-701A ENGINES INSTALLED Final Report, 24 - 25 Jun. 1983

J. I. Nagata, J. Miess, and L. A. Haworth Aug. 1983 45 p
(AD-A140882; AD-E500637; USAAEFA-83-17-F) Avail: NTIS HC A03/MF A01 CSCL 01/3

This limited preliminary evaluation, conducted 24-25 June 1983, consisted of three flights for a total of 4.8 productive flight hours. The significant increase in power available for single engine contingencies (262 shaft horsepower (22%) at 4000 ft pressure altitude, 95 F) is an enhancing characteristic. The excellent torque matching engine stability and rotor speed control with one engine in electrical control unit lockout and the power lever set for level flight at 80 knots indicated airspeed is also an enhancing characteristic for both the T700-GE-701A engine and T700-GE-700 engine. The UH-60A acceleration, deceleration, and normal maneuvering response characteristics are essentially the same with either the T700-GE-700 engine or T700-GE-701A engine installed. Two shortcomings were identified: (1) slow engine acceleration during collective pulls from approximately zero torque to 50% or greater torque; and (2) rotor droop to less than 95% rotor speed during collective pulls from zero torque and during aggressive maneuvers such as a quick stop from the maximum airspeed in level flight. During the evaluation a popping sound was noted during collective pulls to approximately 80% and greater torque settings. This popping sound was subsequently identified as oil canning on the fuselage skin between the pilot's station and gunner/crew chief's window. GRA

N84-26697# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
OPERATIONAL LOADS ON B-747 AIRCRAFT: DESIGN ASSUMPTIONS, ACTUAL EXPERIENCE AND MAINTENANCE ASPECTS

D. J. Spiekhout and C. W. J. vanLummel 21 Aug. 1983 35 p refs Presented at 12th AIDS Symp., Brunswick, 20-22 Sep. 1983
(NLR-MP-83051-U) Avail: NTIS HC A03/MF A01

Usage and loading environment data relevant for fatigue were selected from the standard AIDS recordings of B-747 aircraft. The data are stored in a data base (> 16,000 flights). Groups of flights can be selected from this data base for statistical analysis. By comparing experience with design assumptions, adjustments to the maintenance program (inspection intervals) are possible.
Author (ESA)

N84-26598# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
BATTLE DAMAGE REPAIR OF BIRDSTRIKE RESISTANT LAMINATED TRANSPARENCIES

D. A. Crocker *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 25-45 (For primary document see N84-26596 17-01)
(AD-P003185) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26599# McDonnell Aircraft Co., St. Louis, Mo.
WINDSHIELD WEIGHT REDUCTION THROUGH THE USE OF HIGH STRENGTH GLASS AND POLYURETHANE INTERLAYERS

J. H. Lawrence, Jr. *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 46-56 (For primary document see N84-26596 17-01)
(AD-P003186) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26601# Sierracin Corp., Sylmar, Calif.
A NEW AND UNIQUE CONDUCTIVE ELEMENT FOR AIRCRAFT TRANSPARENCIES

J. B. Olson and D. M. Trebes *In* Dayton Univ. Conf. on Aerospace

Transparent Mater. and Enclosures Dec. 1983 p 72-107 (For primary document see N84-26596 17-01)
(AD-P003188) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26603# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
DEVELOPMENT OF LIGHTWEIGHT COMMERCIAL AIRCRAFT WINDSHIELDS WITH NEW HIGH STRENGTH GLASSES
W. E. Gourley and H. E. Littell, Jr. *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 134-157 (For primary document see N84-26596 17-01)
(AD-P003190) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26604# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
TRANSPARENCY TECHNOLOGY NEEDS FOR MILITARY AIRCRAFT
R. H. Walker *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 158-172 (For primary document see N84-26596 17-01)
(AD-P003191) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26612# Allied Chemical Corp., Morristown, N.J.
NEW HIGH PERFORMANCE WINDSHIELD/CANOPY MATERIALS
B. T. DeBona and D. C. Prevorsek *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 339-381 (For primary document see N84-26596 17-01)
(Contract F33615-78-C-5077)
(AD-P003199) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26625# Dayton Univ., Ohio.
SIMULATION OF EXPOSURE OF AIRCRAFT TRANSPARENCIES TO FLIGHT LINE ENVIRONMENT
A. Piekutowski *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 619-634 (For primary document see N84-26596 17-01)
(AD-P003212) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26626# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
AIRCRAFT TRANSPARENCY TESTING METHODOLOGY
M. E. Kelly *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 635-655 (For primary document see N84-26596 17-01)
(AD-P003213) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26632# Dayton Univ., Ohio.
ALTERNATE T-38 TRANSPARENCY DEVELOPMENT
B. S. West and K. I. Clayton *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 756-775 (For primary document see N84-26596 17-01)
(AD-P003219) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26638# Sierracin Corp., Sylmar, Calif.
THE CERTIFICATION OF POLYCARBONATE TRANSPARENCIES: AN APPEAL FOR REASONABLE REQUIREMENTS
B. G. Hinds *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 859-873 (For primary document see N84-26596 17-01)
(AD-P003225) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26639# Lufthansa German Airlines, Frankfurt (West Germany). Structures Group.
LUFTHANSA GERMAN AIRLINES EXPERIENCE WITH CABIN AND COCKPIT WINDOWS OF BOEING 707, 727, 737, 747, DOUGLAS DC10 AND AIRBUS A300
K. W. Ewald *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 874-891 (For primary document see N84-26596 17-01)
(AD-P003226) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26641# Civil Aviation Authority, Redhill (England). Airworthiness Div.
WINDSHIELD PROBLEMS ON UK OPERATED TRANSPORT SIZED JET AIRCRAFT 1976 TO 1982
J. Thorpe *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 910-919 (For primary document see N84-26596 17-01)
(AD-P003228) Avail: NTIS HC A08/MF A01 CSCL 01/3

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N84-26696# National Oceanic and Atmospheric Administration, Washington, D. C. National Environmental Satellite, Data, and Information Service.
THE NESDIS-SEL LEAR AIRCRAFT INSTRUMENTS AND DATA RECORDING SYSTEM
Gilbert F. Smith, Kenneth O. Hayes, John S. Knoll, and Robert S. Koyanagi Jun. 1984 38 p refs
(NOAA-TR-NESDIS-9) Avail: NTIS HC A03/MF A01

Support of the NOAA-NESDIS Satellite Vicarious Calibration effort requires the use of aircraft mounted field instrumentation to conduct high altitude measurements of radiance from White Sands, New Mexico. Small laboratory spectrometers were adapted for aircraft environment and modified so that their visible wavelength dynamic range and their spectral and spatial characteristics would commensurate with specific satellite instruments. Author

N84-26699# Arinc Research Corp., Annapolis, Md.
COCKPIT DATA MANAGEMENT REQUIREMENTS (CURRENT TECHNOLOGY AIRCRAFT) Final Report
T. P. Berry Oct. 1983 304 p
(Contract DTFA01-80-C-10030)
(AD-A140643; Rept-1378-03-8-3150; DOT/FAA/PM-83/25) Avail: NTIS HC A14/MF A01 CSCL 01/3

This study describes a technique for estimating the effect of the data management tasks imposed on flight crews by new systems. It presents the development of a data base of data management tasks in current technology aircraft and examines the effect of four proposed new systems on the data management tasks of a flight crew in these aircraft. The annexes to the appendix represent data items and times for various emergency situations. Annex A shows the effect of hydraulic and flight control malfunction and Annex B presents the effect of engine failure due to fire. Times and data items for these conditions were developed in a United Airlines DC-10 flight simulator. GRA

N84-26700# Aircraft Research and Development Unit, Edinburg (Australia).
A DEVICE FOR MEASUREMENT OF CONTROL COLUMN FORCES IN AIRCRAFT
G. A. Morgan Mar. 1984 25 p
(AD-A140876; AD-E500637; ARDU-TN-GEN-19) Avail: NTIS HC A02/MF A01 CSCL 01/4

A device is described which is incorporated within a pilot's flying glove to measure forces exerted by the pilot on the control column of an aircraft during flight tests. This device enables a test pilot to obtain a quantitative measurement, rather than a subjective estimate of stick force which, together with the observation of normal load factor and variation, in airspeed, enables the calculation of parameters such as stick force per g and stick force gradient in non-maneuvering flight. This device is independent of aircraft-integral flight test instrumentation and can thus be used in any aircraft being flight tested. Author (GRA)

N84-26566# Flight Data Co., London (England).
ARE WE GIVING AIRCRAFT INTEGRATED DATA SYSTEMS USERS THE BEST INFORMATION IN THE BEST WAY AT THE BEST TIME?
P. Waller and E. R. White *In* DFVLR Proc. of 12th Symp. on

Aircraft Integrated Data Systems Feb. 1984 p 9-23 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26567# Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (West Germany).
ACCESS TO MAINTENANCE VIA AIRCRAFT INTEGRATED DATA SYSTEM (AIDS): FUTURE ASPECTS OF THE EXPANDED AIDS
H. Kalbe *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 25-50 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26568# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
INTELLIGENT FLIGHT DATA RECORDER: A CONTRIBUTION TO ON-CONDITION MAINTENANCE AND OPTIMIZATION OF OPERATION
B. Mueller and U. Schutz *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 51-70 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26569# National Aerospace Lab., Amsterdam (Netherlands).
OPERATIONAL LOADS ON B-747 AIRCRAFT: DESIGN ASSUMPTIONS, ACTUAL EXPERIENCE AND MAINTENANCE ASPECTS
D. J. Spiekhout and C. W. J. vanLummel *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 71-106 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26570# Rolls-Royce Ltd., Bristol (England).
THE DEVELOPMENT OF MILITARY AIRCRAFT ENGINE MONITORING SYSTEMS
C. M. OConnor and R. L. Thompson (Plessey Radio Systems, Havant, England) *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 107-141 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26571# Deutsche Lufthansa Aktiengesellschaft, Cologne (West Germany).
ENGINE CONDITION MONITORING WITH AIRCRAFT INTEGRATED DATA SYSTEMS ON LUFTHANSA A310
H. Reilaender and H. Schlueter *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 143-163 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26572# Deutsche Lufthansa A.G., Hamburg (West Germany).
FIRST EXPERIENCE WITH ARINC 717 AIRCRAFT INTEGRATED DATA SYSTEMS (AIDS) ON AIRBUS 310 FOR MAINTENANCE SUPPORT
P. Ladwig *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 165-182 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26573# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
FAILURE IDENTIFICATION MODULE (FIM) FOR DIGITAL CONTROL SYSTEMS
G. Dahl *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 183-202 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26574# National Transportation Safety Board, Washington, D. C.
UPGRADED AIRCRAFT ACCIDENT RECORDER STANDARDS
Carol A. Roberts *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 203-242 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26575# Ministry of Transport and Civil Aviation (England). Accidents Investigation Branch.
DEFICIENCIES OF CURRENT FLIGHT DATA RECORDERS IN ACCIDENTS INVESTIGATION
R. A. Davis *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 243-275 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26576# Fairchild Weston Systems, Inc., Sarasota, Fla.
THE FAIRCHILD DIGITAL FLIGHT RECORDER (DFR) F 800
Hans F. Napfel *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 277-312 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26577# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugmechanik.
ANALYSING REDUNDANT FLIGHT PATH DATA ON TWO AIRBUS A-300 AIRCRAFT
O. Weber and G. Rosenau *In its* Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 313-348 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26578# Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
PERFORMANCE VALIDATION OF LEAR SIEGLER FLIGHT MANAGEMENT SYSTEMS
M. K. DeJonge *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 349-368 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26579# Delco Systems Operations, Milwaukee, Wis.
DELCO PERFORMANCE MANAGEMENT SYSTEM FLIGHT TEST EVALUATION
J. Kaufman *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 369-394 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26580# Sperry Rand Corp., Phoenix, Ariz. Flight Systems Div.
PERFORMANCE VALIDATION OF SPERRY FLIGHT MANAGEMENT SYSTEMS (FMS)
Roger Keller *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 395-431 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26581# British Airways, Middlesex (England).
AIRLINE EXPERIENCE WITH AVIONIC SOFTWARE DEVELOPMENT FOR AIRCRAFT INTEGRATED DATA SYSTEMS
Colin Murfet *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 433-457 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26582# Societe de Fabrication d'Instruments de Mesure, Massy (France).
AIRCRAFT INTEGRATED DATA SYSTEMS (AIDS) ON MEDIUM SIZE AIRCRAFT
M. Penetro *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 459-482 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26583# Naval Air Test Center, Patuxent River, Md.
THE SILICON AIDS (AIRBORNE INTEGRATED DATA SYSTEMS)

Daniel M. Watters, Joseph A. Alfano (NADC), and Dennis Amundson (Sperry Corp.) *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 483-508 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26584# Naval Air Test Center, Patuxent River, Md.
CRASH POSITION INDICATOR/CRASH SURVIVAL FLIGHT DATA RECORDER (CPI/CSFDR): EJECTABLE VERSUS NON-EJECTABLE
Daniel M. Watters *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 509-534 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26585# Technische Univ., Brunswick (West Germany). Inst. fuer Flugfuehrung.
ON-LINE ACQUISITION AND PROCESSING OF FLIGHT MECHANICAL DATA ON BOARD THE RESEARCH AIRCRAFT OF THE TECHNISCHE UNIVERSITAET, BRUNSWICK
Artur Redeker *In* DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 535-553 (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26586# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
PILOT-AIRCRAFT INTERACTION CONCERNING A WIND SHEAR INDICATION SYSTEM
Uwe Teegan and Monika Mittendorf *In its* Proc. of 12th Symp. on Aircraft Integrated Data Systems Feb. 1984 p 555-577 refs (For primary document see N84-26565 17-01)
Avail: NTIS HC A25/MF A01

N84-26594# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
PHYSICAL INTEGRATION OF THE HUD (HEAD-UP DISPLAY)
R. W. Schwartz *In* Aerospace Medical Research Labs. Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 67-73 (For primary document see N84-26587 17-01)
(AD-P003163) Avail: NTIS HC A05/MF A01 CSCL 01/3

N84-26595# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
FUTURE DEVELOPMENT TRENDS FOR HEAD-UP DISPLAYS
J. F. Coonrod *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 74-82 (For primary document see N84-26587 17-01)
(AD-P003164) Avail: NTIS HC A05/MF A01 CSCL 01/3

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-26701 Carnegie-Mellon Univ., Pittsburgh, Pa.
FRICTION DAMPING OF FLUTTER IN GAS TURBINE ENGINES Ph.D. Thesis
Alok Sinha 1983 121 p
Avail: Univ. Microfilms Order No. DA8406453

The feasibility of using friction dampers to control flutter in gas turbine engine rotor stages is investigated. The stabilizing effects to blade to ground dampers are studied on the basis of a single degree of freedom model of an isolated blade. The range of initial conditions over which the response is stable, the maximum negative damping that can be stabilized, the effect of external excitation, and the determination of optimum damper parameters are each examined. The physical concepts and mathematical techniques required to analyze and understand the effects of friction dampers on aerodynamically unstable rotor stages are developed. The influence of friction on the torsional blade flutter is examined. On the basis of the results of three, six, nine, and twelve bladed disks, the use of friction dampers in controlling flutter appears promising. Dissert. Abstr.

N84-26702*# Garrett Turbine Engine Co., Phoenix, Ariz.
DILUTION JET MIXING PROGRAM
R. Srinivasan, E. Coleman, and K. Johnson Jun. 1984 354 p refs
(Contract NAS3-22110)
(NASA-CR-174624; NAS 1.26:174624; Garrett-21-4804) Avail: NTIS HC A16/MF A01 CSCL 21E

Parametric tests were conducted to quantify the mixing of opposed rows of jets (two-sided injection) in a confined cross flow. Results show that jet penetrations for two sided injections are less than that for single-sided injections, but the jet spreading rates are faster for a given momentum ratio and orifice plate. Flow area convergence generally enhances mixing. Mixing characteristics with asymmetric and symmetric convergence are similar. For constant momentum ratio, the optimum S/H(0) with in-line injections is one half the optimum value for single sided injections. For staggered injections, the optimum S/H(0) is twice the optimum value for single-sided injection. The correlations developed predicted the temperature distributions within first order accuracy and provide a useful tool for predicting jet trajectory and temperature profiles in the dilution zone with two-sided injections. A.R.H.

N84-26703# Draper (Charles Stark) Lab., Inc., Boston, Mass. Aviation and Surface Effects Dept.
OPTIMIZING THE THRUST DEFLECTING SURFACE FOR THE PNEUMATIC THRUST DEFLECTOR Final Report
M. J. Harris Mar. 1984 36 p
(Contract MIPR-FY1456-83-N-0026)
(AD-A140612; DTNSRDC/ASED-84/02) Avail: NTIS HC A03/MF A01 CSCL 21/5

A pneumatic thrust deflector has been developed in which the thick slipstream from a turbojet is deflected by blowing a thin jet sheet tangentially over a deflecting surface adjacent to the slipstream. In developing this concept, three geometries have been evaluated for the thrust deflecting surface. The three deflecting surfaces are cylindrical with a semicircular, a quarter-circular, or a semielliptical cross section. The range of thrust deflection achievable with each deflecting surface was determined by using each surface to deflect the slipstream of a small turbojet simulator. In the cold gas investigation, a thrust deflection of 20 deg or more was achieved with this mechanically simple system. The cold gas performance is compared to the range of thrust deflection achieved by pneumatically deflecting the hot gas of a small turbojet. Results of the hot gas investigation are also presented. Author (GRA)

N84-26704# Air Force Academy, Colo.
TURBOFAN ENGINE TECHNOLOGY EVALUATION SYSTEM, USER'S GUIDE Final Technical Report, Jan. 1983 - Mar. 1984
V. J. Villhard Apr. 1984 138 p
(AF Proj. 2307)
(AD-A140781; FJSRL-TR-84-0002) Avail: NTIS HC A07/MF A01 CSCL 21/5

The user guide includes a description of the general layout of the system, the general approach used in calculating gas properties throughout the engine simulation model, the recommended limitations and suggested constraints of the system, how the performance calculated by TRBOFN, the engine simulation program in this system, compares to SMOTE, an accepted standard turbofan engine simulation program, and discussion of the general conventions followed in developing the system. The Turbofan Engine Technology Evaluation System is intended to be a computer age

back-of-the-envelope calculation tool for use in evaluating the relative payoffs of competing gas turbine engine technologies. The system consists of four programs: SETUP - an interactive graphics program used to select and input design cycle parameters for the engine and the flight conditions at which performance is to be calculated. TRBOFN - the turbofan engine performance simulation program; ENCOM - an interactive engine sizing and comparison program that also allows selection of performance parameters for graphs and comparison of up to five engines' performance powering an airplane through an eleven leg fighter/ground attack mission. The bottom line output in this comparison is the minimum fraction of take-off gross weight that must be fuel for the airplane to complete the mission using each engine under consideration; and GRAPH - an interactive graphics program for the creation of publication quality graphs of almost any calculated parameter versus any other. GRA

N84-26705# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
OPERATING CONDITIONS AND MATERIALS SELECTION AND DEVELOPMENT IN GAS TURBINES
A. J. A. Morn 23 Dec. 1983 23 p refs Presented at Netherlands Association of Aeronautical Engineering (NVVL) Meeting, Amsterdam, 16 Dec. 1980
(NLR-MP-81012-U) Avail: NTIS HC A02/MF A01

Temperatures, temperature profiles, and stresses in gas turbine components; transient temperature conditions, occurring as a result of, e.g., throttle setting changes and affecting thermal fatigue life; and electrochemical corrosion, oxidation, hot corrosion, and erosion, as well as the factors which promote these types of attack, including atmospheric pollutants and fuel contaminants are discussed. Material selection criteria for compressor components, flame tubes, turbine blades, vanes and disks are considered. Directionally solidified eutectics, oxide-dispersion-strengthened alloys, fiber-reinforced superalloy composites and ceramics are assessed. Single crystal blade processing and powder metallurgy are treated. Author (ESA)

N84-26905# Joint Publications Research Service, Arlington, Va.
PROCEDURE FOR DETERMINATION OF DAMPING CAPABILITY OF TURBOMACHINE BLADES SUBJECTED TO HEAT AND CENTRIFUGAL FORCES Abstract Only
A. Ya. Adamenko, L. G. Tokar, and V. V. Matveyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 12 Transl. into ENGLISH from Probl. Proch. (Kiev), no. 7, Jul. 1983 p 54-57 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26906# Joint Publications Research Service, Arlington, Va.
ESTIMATING THERMAL FATIGUE STRENGTH OF PROTOTYPE BLADES IN GAS TURBINE ENGINE Abstract Only
M. Ye Kolotnikov and S. Yu. Strilets *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 13 Transl. into ENGLISH from Probl. Proch. (Kiev), no. 7, Jul. 1983 p 15-17 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N84-26708# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung fuer Flugmechanik.
IN-FLIGHT INVESTIGATION OF LANDING APPROACH FLYING QUALITIES OF TRANSPORT AIRCRAFT WITH RELAXED STATIC STABILITY
Knut Wilhelm and Dieter Schafranek Jan. 1984 86 p refs
(DFVLR-FB-84-11) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 29

An in-flight simulator was used to investigate the influence of longitudinal static stability reduction on the landing approach flying qualities of transport aircraft. The static margin was varied from 14% MAC to -10% MAC by rearward center of gravity translation. No clear tendency of Cooper-Harper pilot ratings to deteriorate with decreasing stability is detectable until inherent instability, corresponding to 6 sec time-to-double amplitude, is reached. Mean Cooper-Harper ratings for all pilots show a slight improvement when the static margin is changed from 14% to 5% MAC. The effect of turbulence on the configuration is relatively low until time-to-double amplitude reaches 6 sec. For configurations with a time-to-double amplitude of < 6 sec, turbulence intensity becomes greater and determines the gradient of deterioration. Pilot effort ratings and comments confirm the Cooper-Harper rating tendency. After an initial drop their effort to fulfill the task with the same accuracy in all cases increases with increasing instability. Author (ESA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N84-26707# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DESIGN STUDY FOR A LOW DENSITY WIND TUNNEL M.S. Thesis - 6 Dec. 1983 [ANTE-PROJETO DE TUNEL AERODINAMICO DE BAIXA DENSIDADE]
Ronaldo Bologna Abrao Apr. 1984 167 p refs In PORTUGUESE; ENGLISH summary
(INPE-3072-TDL/160) Avail: NTIS HC A08/MF A01

A basic study of the design of a low density wind tunnel is presented. The various components of the tunnel are described and the principal design parameters are analyzed. A detailed analysis of nozzle flow is made for designing supersonic nozzle for low density flows. The tunnel instrumentation, the principal difficulties involved in the theoretical and the experimental investigation of aerodynamics of satellites, as well as other aspects of interest are discussed. M.A.C.

N84-26708*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUPPORT INTERFERENCE OF WIND TUNNEL MODELS: A SELECTIVE ANNOTATED BIBLIOGRAPHY
Marie H. Tuttle and Pierce L. Lawing May 1984 13 p Supplement to NASA-TM-81909: See N81-20084
(NASA-TM-81909; NAS 1.15:81909) Avail: NTIS HC A02/MF A01 CSCL 14B

This bibliography, with abstracts, consists of 143 citations arranged in chronological order by dates of publication. Selection of the citations was made for their relevance to the problems involved in understanding or avoiding support interference in wind tunnel testing throughout the Mach number range. An author index is included. E.A.K.

N84-26709# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
A THREE-DEGREE-OF-FREEDOM FLIGHT SIMULATOR FOR SPIN-STABILIZED PROJECTILES Final Report
W. P. DAmico, Jr. Mar. 1984 23 p
(DA Proj. 1L1-62618-AH-80)
(AD-A140657; AD-F300411; ARBRL-MR-03341) Avail: NTIS HC A02/MF A01 CSCL 19/1

A three-degree-of-freedom flight simulator has been constructed to model the free-flight angular motion of spin-stabilized projectiles. Hydraulic actuators are used to drive a conventional

gimbal system producing pitch and yaw, while an electric motor yields steady roll rates as fast as 200 Hz. GRA

N84-26710# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.
RESEARCH ISSUES IN TRAINING DEVICE DESIGN: THE ORGANIZATION OF A DATA BASE Final Report
R. T. Hays and M. J. Singer Sep. 1983 75 p
(DA Proj. 2Q2-62722-A-795)
(AD-A140815; ARI-TR-588) Avail: NTIS HC A04/MF A01 CSCL 05/9

This paper is an accumulation and categorization of training systems research issues which are critical in making training device design decisions. The training system research issues are organized around an Instructional Systems Development (ISD) type framework, and the research literature on these issues is reviewed. A means for accumulating new and existing data as well as accessing the empirically derived information and generating training device design guidance is proposed. Author (GRA)

N84-26711# Systems Associates, Inc., Long Beach, Calif.
COMMAND FLIGHT PATH DISPLAY, PHASE 1 AND 2 Final Technical Report, 20 Apr. 1982 - 29 Sep. 1983
G. W. Hoover, V. T. Cronauer, S. Shelley (Intermetrics, Inc.), J. N. Dittenhauser (Calspan Corp.), B. J. Eulrich, and P. A. Reynolds (Calspan Corp.) Sep. 1983 94 p Prepared in cooperation with Calspan Corp.
(Contract F33615-79-C-3618)
(AD-A140870; CALSPAN-6645-F-12; R83-49-App-A-E; S82-03-App-A-E; SAI-83-01-App-A-E) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report covers the development of the Command Flight Path Display System and the actual Flight Test Operation of the System including the evaluation of the CFPD concept by analysis of flight test recorded data. It proves the validity of the CFPD concept which consists of a totally integrated pictorial presentation of the fundamental information necessary to effectively perform all of the normal basic flight operations with and without reference to the real world. The actual flight test: (1) Demonstrated that the CFPD was in fact a truly integrated display which provided the pilot with adequate information to execute take-off, climb, cruise/navigation, approach and landing, without reference to conventional parametric displays, or the real world. (2) Established that pilot performance with the CFPD was enhanced, demanding minimal concentration on the display, minimizing inadvertent departures, and requiring minimal training time, both initially and for maintaining flight proficiency, as compared to performance utilizing standard symbolic displays. (3) Proved that the electronic system required to generate the CFPD can be achieved by modifying current aircraft display and control systems through the utilization of computer graphics picture processing techniques. Author (GRA)

N84-26712# Systems Associates, Inc., Long Beach, Calif.
COMMAND FLIGHT PATH DISPLAY, PHASE 1 AND 2. APPENDICES A - E Final Technical Report
Sep. 1983 131 p Prepared in cooperation with Calspan Corp.
(Contract F33615-79-C-3618)
(AD-A140871; CALSPAN-6645-F-12-APP-A-E; R83-49-App-A-E; S82-03-App-A-E; SAI-83-01-App-A-E) Avail: NTIS HC A07/MF A01 CSCL 09/2

Ground simulation of the Command Flight Path Display System commenced on January 27, 1983, and continued through April 20, 1983. Approximately ninety-one hours of simulation were accumulated during this timeframe. The simulation flights involved display parameter changes and adjustments, introduction and preparation of pilots for the actual flight test, and demonstration flights. A breakdown of the simulation is presented in this report. Author (GRA)

N84-26713# Battelle Columbus Labs., Ohio.
HEAT: INITIATED FURAN RESIN FOR RAPID RUNWAY REPAIR Final Report, Mar. - Sep. 1982
J. P. Pfau, F. A. Forster, R. L. Huggins, and M. J. Snyder Tyndall AFB, Fla. Air Force Engineering and Services Center. Aug. 1983 31 p
(Contract F08635-82-C-0187; AF Proj. 2673)
(AD-A140902; AFESC/ESL-TR-82-37) Avail: NTIS HC A03/MF A01 CSCL 11/9

This project established the feasibility of a furan polymer concrete composition utilizing an inorganic latent catalyst which achieves a longer working time; has reduced mixing complexity, and possesses less sensitivity to variations in material temperature than previous compositions. This composition can be heat initiated to begin polymerization at any time up to the end of the working time and attains a minimum average flexural strength of greater than 500 psi 1 hour after placement. Several promising concepts were briefly explored in addition to the inorganic latent catalyst approach. The inorganic latent catalyst approach was unable to achieve cure through exotherm propagation at the lower temperatures using a flame-point initiation. Flame-point initiation consists of heating a portion of the repair surface with an open flame and allowing the exotherm to carry the polymerization (cure) throughout the polymer concrete. Due to the failure of this approach, a more conventional active acid blend with a freezing point below 5 deg F was used as a catalyst at the lower temperatures. GRA

N84-26714# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.
EVALUATION OF SELECTED COMMERCIAL CONSTRUCTION EQUIPMENT FOR BOMB DAMAGE REPAIR Final Report, Jan. - Jun. 1980
E. F. Alexander and R. W. Grahn Mar. 1984 54 p
(DA Proj. 2054)
(AD-A140907; AFESC/ESL-TR-81-49) Avail: NTIS HC A04/MF A01 CSCL 13/3

Three pieces of commercial equipment, a loader, an excavator, and a combination loader/backhoe, were evaluated for use in rapid repair of damaged airfields. The equipment was evaluated for their ability to remove damaged, upheaved concrete from around bomb craters. The actual force required to remove damaged concrete was also measured on an explosively formed crater. The force required was found to be in the 20,000-25,000 lb range. Of the three pieces of equipment evaluated the most capable was the large front-end loader; however, it was found to be too large for the smaller craters. The hydraulic excavator would be the best machine for the job if it had at least 25,000 pounds of breakout force. GRA

N84-26715# Federal Aviation Administration, Washington, D.C. Program Engineering and Maintenance Service.
AIRFIELD DELAY SIMULATION MODEL (ADSIM) USERS GUIDE
Helen Monk and Robert Holladay Jan. 1984 116 p
(PB84-171552; DOT/FAA/PM-84/2; FAA-DF-84-001A) Avail: NTIS HC A06/MF A01 CSCL 01E

ADSIM is a discrete event simulation model which can be used to study airport capacity and delay. The model calculates travel time, delay, and flow rate data to analyze components of an airport, airport operations, and operations in the adjacent airspace. This document provides the information necessary to use the ADSIM appropriately. It describes the modeling methodology and contains instructions for preparing the input data, applying the model, and interpreting the output. Author (GRA)

N84-26716# Ducharme (Robert G.), Inc., Deerfield, Ill.
AIRPORT NOISE AND LAND USE COMPATIBILITY AT DOWNSTATE ILLINOIS AIRPORTS
Robert G. Ducharme Aug. 1983 80 p refs Sponsored by the Illinois Dept. of Energy and Natural Resources
(Proj. 83/5002)
(PB84-177377; IL-ENR/RE-83/27) Avail: NTIS HC A05/MF A01 CSCL 01E

This report represents the second and final phase of an airport noise demonstration project at the Decatur Airport that was launched in 1982. The objective of this project was to show how an airport and its neighboring community can develop and

implement a program to correct and prevent airport noise exposure problems. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N84-26717# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A PRELIMINARY DEFINITION OF THE BRAZILIAN COMPLETE SPACE MISSION (MECB) GROUND SEGMENT [DEFINICAO PRELIMINAR DO SEGMENTO SOLO DA MECB]
Pawel Rozenfeld Mar. 1984 67 p refs In PORTUGUESE; ENGLISH summary
(INPE-3036-NTE/215) Avail: NTIS HC A04/MF A01

In this work a preliminary definition of the Brazilian Complete Space Mission (MECB) Ground Segment is done. The functional, operational and availability requirements of the REDINPE (INPE's Satellite Support Network), ground stations, communication network, control center, mission center and launch base installations are investigated. Based on this study a functional break down of each one of these subsegments of the ground segment is performed and general characteristics of their main subsystems are presented. Author

N84-26718*# National Aeronautics and Space Administration, Washington, D. C.
AN EXPERIMENT PROPOSED AND SET UP BY THE READERS WILL BE FLYING ON BOARD THE SHUTTLE; THESE ARE THE RULES OF THE GAME; THE EXPERIMENTS OF OTHERS
P. Pazzano and Giancarlo Masini Jun. 1982 19 p Transl. into ENGLISH of Sci. and Vita Nuova (Italy), no. 18, 1982 p 1-6
(NASA-TM-77102; NAS 1.15:77102) Avail: NTIS HC A02/MF A01 CSCL 22A

The 400th round trip ticket to space via the space shuttle is booked in the name of an Italian journal. Students from that country are offered an opportunity to propose an experiment for NASA's Get Away Special program. The dimensional characteristics of the container, as specified by NASA, are given as well as limitations of weight, volume, diameter, and height for the experiment. The types of experiments in the OSS-1 payload and their operation are described. A.R.H.

N84-26719# European Space Agency, Paris (France).
THE EFFECT OF GRAVITY ON THE SOLIDIFICATION OF IMMISCIBLE ALLOYS
Erica Rolfe, comp. and Bruce Battrick, comp. Mar. 1984 100 p refs Proc. of Royal Inst. of Technology/ESA/Swedish Space Corp. Workshop, Jaerva Krog, Sweden, 18-20 Jan. 1984
(ESA-SP-219; ISSN-0379-6566) Avail: NTIS HC A05/MF A01

Separation of alloys exhibiting a miscibility gap; thermodynamics of the decomposition of liquid alloys; space results on the solidification of immiscible alloys; influences affecting separation in monotectic alloys under microgravity; solidification and Ostwald ripening of near monotectic Zn-Pb alloys; stability of a metallic dispersion; component separation during cooling and solidification of dispersions of immiscible alloys; melting and solidification of metallic composites; Ostwald ripening, interfacial energies and diffusion coefficients in monotectic systems; formation and retention of fine aluminide dispersions in aluminum; acoustic mixing of an immiscible alloy (Pb-Zn) in microgravity; and a filtration theory approach to immiscible alloy solidification were discussed. For individual titles, see N84-26720 through N84-26730.

N84-26720# Battelle Inst., Frankfurt am Main (West Germany).
ON THE SEPARATION OF ALLOYS EXHIBITING A MISCIBILITY GAP **c26**
D. Langbein *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 3-12 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

Mechanisms contributing to the separation of immiscible alloys are discussed. Separation is demonstrated with transparent model systems. Theoretical models of the different effects are reviewed. Ways to avoid macroscopic separation are suggested. Author (ESA)

N84-26721# Max-Planck-Institut fuer Metallforschung, Stuttgart (West Germany).
THERMODYNAMICS OF THE DECOMPOSITION OF LIQUID ALLOYS **c26**
R. Lueck and B. Predel *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 13-23 refs Prepared in cooperation with Stuttgart Univ. (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

Factors responsible for the decomposition of liquid alloys were modeled. The influence of surface and interface energies as well as the volume relation of the phases under zero gravity on samples in levitation on the equilibrium arrangement of segregated alloys is shown. The equilibrium form of a melt totally enclosed within a vessel under microgravity is discussed. Kinetic factors which cause the transition of a finely dispersed phase distribution into the equilibrium arrangement under zero gravity are indicated. Author (ESA)

N84-26722# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.
SPACE RESULTS ON THE SOLIDIFICATION OF IMMISCIBLE ALLOYS **c26**
H. Fredriksson *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 25-34 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

The structures formed during the solidification of immiscible alloys in space are presented. The structure are theoretically analyzed. The droplet sizes received by diffusion controlled growth are compared with experimentally observed sizes. Large differences are noted. Coalescence processes are analyzed and it is found that the Marangoni migration of droplets is the most important factor for determining the structure formed. Author (ESA)

N84-26723# Hamburg Univ. (West Germany).
INFLUENCES AFFECTING SEPARATION IN MONOTECTIC ALLOYS UNDER MICROGRAVITY
H. Ahlborn, J. Hoegel, and K. Loenberg (Technische Univ., Berlin) *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 37-40 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

The influence of volume content, and surface tension on the distribution of the second minority phase of the separation of molten alloys into two layers under réduced gravity was studied. Zinc-bismuth and Zn-Pb-Bi specimens were processed under microgravity on Spacelab. Results of X-ray inspection show an inhomogeneous phase distribution, particularly in Zn-rich specimens. Author (ESA)

N84-26724# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Simulation.
FIRST RESULTS OF A MAUS EXPERIMENT TO INVESTIGATE THE STABILITY OF A METALLIC DISPERSION **c26**
G. H. Otto *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 43-46 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

Isothermal and rate dependent processes affecting liquid-liquid dispersion of mercury droplets in a gallium matrix were investigated by X-ray transmission photography on STS-7. The sample was cooled into the miscibility gap only. Homogenization finishes after 4 hr at 220 C. No finely dispersed state is observed at the X-ray photo resolution limit of 0.3 mm. Supercooling of the

melt is < 20 C. When cooling into the gap at 30 K/min, precipitated droplet growth is fast, but becomes slower at 1.7 K/min. No droplet movement due to residual acceleration is observed over a 2 hr period. Author (ESA)

N84-26725# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Warkstoff-Forschung.
PREPARATION OF DISPERSION ALLOYS: COMPONENT SEPARATION DURING COOLING AND SOLIDIFICATION OF DISPERSIONS OF IMMISCIBLE ALLOYS c26
H. U. Walter *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 47-64 refs Sponsored by ESA and Bundesministerium fuer Forschung und Technologie (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

The feasibility of producing dispersion alloys from binary systems with a miscibility gap was investigated during Texus sounding rocket flights. The stability of liquid-liquid dispersions was studied with model systems (Ag-Na-silicate glass). Results show that dispersions are only stable below a volume fraction of 10%, for geometrical reasons. Studies with Al-Pb, Al-In and Al-Bi confirm this finding. Dispersions are obtained. Interaction with the solidification front and in particular transport due to Marangoni convection is found to be of great importance. Author (ESA)

N84-26726# Katholieke Universiteit te Leuven (Belgium). Dept. Metaalkunde.
MELTING AND SOLIDIFICATION OF METALLIC COMPOSITES c26
A. Deruyterre and L. Froyen *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 65-67 ref (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

Metallic composite materials consisting of a copper matrix with different kinds of dispersed particles were melted and solidified under microgravity conditions in a rocket-borne isothermal furnace, in order to identify the forces causing displacement of particles in a melt. The interfacial properties of the liquid phase of the metal matrix; the solid phases of the dispersed particles, of the solidifying matrix and of the crucible-wall material; and the gas phase were studied, using Cu-SiC, Cu-SiO2 and Cu-W. Only Cu-W shows good mutual wetting behavior between the dispersed phase and the matrix. Results show that it is possible to maintain a fairly uniform dispersion of nonwetting particles in a matrix melted in microgravity conditions provided the metal wetted the crucible. In the same experiment on Earth and in a similar experiment in microgravity but performed in a nonwetting crucible, the dispersion is not maintained. Author (ESA)

N84-26727# Max-Planck-Institut fuer Metallforschung, Stuttgart (West Germany). Inst. fuer Werkstoffwissenschaften.
OSTWALD RIPENING, INTERFACIAL ENERGIES AND DIFFUSION COEFFICIENTS IN MONOTECTIC SYSTEMS c26
H. F. Fischmeister and H. E. Exner *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 69-70 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

Coarsening by Ostwald ripening of two immiscible liquids is studied in order to establish the physical constants determining the coarsening kinetics (interfacial energy and diffusion coefficients) independently from each other and from gravitational effects and to confirm the validity of coarsening theories in monotectic systems. Using the theory of grain boundary grooving, additional relationships between the physical constants are obtained. The equilibrium dihedral angle at the grain boundaries of the solid in equilibrium with one of the melts yields the ratio of interfacial and grain boundary energy. The rate of grain boundary grooving is a function of these energies and the diffusion constant in the liquid. Together with the equations for coarsening kinetics, a sufficient number of independent equations is obtained to establish the values of the physical constants involved. A Spacelab mission in which gravitational separation of the two liquids and convection are eliminated is outlined. Author (ESA)

N84-26728# European Space Research and Technology Center, Noordwijk (Netherlands).
ACOUSTIC MIXING OF AN IMMISCIBLE ALLOY (Pb-Zn) IN MICROGRAVITY
P. F. Clancy and W. Heide (Battelle Inst.) *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 72-77 ref (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

An acoustic mixer was used to mix an immiscible Pb-Zn alloy in the microgravity conditions of Texus sounding rocket flights. Results show that for an immiscible alloy with a critical concentration of the minor component (Pb), in the absence of mixing, rapid and extreme coagulation occurs. In this case mixing can be used in microgravity conditions to produce a fine dispersion with results better than those achievable on ground, even with mixing, and is a necessary technique to prevent rapid coagulation of a critical composition in microgravity. Author (ESA)

N84-26729# Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
FILTRATION THEORY APPROACH TO IMMISCIBLE ALLOYS SOLIDIFICATION c26
C. Potard *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 79-82 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

Results of experiments on the solidification of Al-In hypermonotectic alloys are presented. The pressures acting on the globules at solidification and nonsolidification interfaces are discussed. The analogy between filtration and solidification under microgravity is considered and, treating the globules as an interacting population, a model for immiscible alloy solidification is proposed. Results show that a pressure barrier exists at the solid/liquid front. Globules must be considered as an interactive population. Filtration theory concepts predict the incorporation process in microgravity experiments with acceptable credibility. Author (ESA)

N84-26730# Fulmer Research Inst. Ltd., Stoke Poges (England).
SOLIDIFICATION OF Al-Pb ALLOYS UNDER MICROGRAVITY IN TEXUS-7, PRELIMINARY REPORT
W. G. Hopkins *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 83-86 (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

The stability of various dispersions of lead in liquid aluminum under microgravity and 1-g conditions was examined, in order to demonstrate the increased stability of the emulsions due to microgravity when the sedimentation force is reduced; and to give initial indications of the importance of surface energy effects on agglomeration and solidification front inclusion when the distorting effects of gravity are removed. Results for six samples are shown. Author (ESA)

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N84-26945# Joint Publications Research Service, Arlington, Va.
STABILITY OF PERIODIC OSCILLATIONS OF ALMOST AXISYMMETRIC SATELLITE IN PLANE OF ELLIPTICAL ORBIT Abstract Only
A. L. Petrov, V. V. Sazonov, and V. A. Sarychev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 43 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 41-50 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air)*.

N84-26731 Prins Maurits Lab. TNO, Rijswijk (Netherlands).
FLOW PATTERN IN AN INDOOR ROCKET TEST STAND DURING STATIC FIRING OF SOLID PROPELLANT ROCKET MOTORS
P. A. O. G. Korting May 1983 49 p refs
(PML-1983-40; TDCK-78820) Copyright. Avail: Issuing Activity

During static firing of 10 low thrust short burning rocket motors and 1 long burning rocket motor, velocity and temperature of the flow in the longitudinal section of the indoor rocket test stand were measured. Results indicate that the flow velocities measured are lower than predicted. The temperature rise, however, is larger than predicted. This can be attributed to afterburning of the fuel-rich combustion gases with the oxygen from the mixing air.
Author (ESA)

N84-26869# Joint Publications Research Service, Arlington, Va.
SECOND ARIANE LAUNCH PAD AT KOUROU, BELGIAN PARTICIPATION
Paul Dominique *In its* West Europe Rept. Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 4-7 refs Transl. into ENGLISH from La Libre Belgique (Brussels), 6 Mar. 1984 p 11 (For primary document see N84-26868 17-31)
Avail: NTIS HC A04/MF A01

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N84-26732# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
OPTIMAL POSITION OF SOLAR ARRAYS ON SUNSYCHRONOUS SATELLITES [POSICIONAMENTO OTIMO DE PAINEIS SOLARES EM SATELITES SOLSINCRONOS]
Valdemir Carrara and Valder Matos deMedeiros Feb. 1984 53 p refs In PORTUGUESE; ENGLISH summary
(INPE-3010-RPE/454) Avail: NTIS HC A04/MF A01

The optimal positioning of fixed and rotating solar arrays in Sun-synchronous satellites is analyzed, aiming at the better use of available solar energy. The influence of the Earth orbit eccentricity and the declination motion of the Sun is considered. The optimization criterion proposed was to maximize the energy in an orbit, during a period of the year where the available energy is minimum. In this way, the power in any other epoch is guaranteed to be greater. A computer program that gives the optimal positioning of the solar arrays (fixed or rotating), by means of orbital parameters and equator crossing hour, was developed. The program uses iterative methods and gives the data when the energy is minimum. A comparison between the fixed arrays and the rotating ones is made, giving, in this way, resources to decide which type of the panel should be used in a given mission. M.G.

N84-26733# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SATELLITE CONTROL BY STABILIZING FLAPS Ph.D. Thesis [CONTROLE DE SATELITES POR ALETAS ESTABILIZADORAS]
Luiz Danilo Damasceno Ferreira Sep. 1983 110 p refs In PORTUGUESE; ENGLISH summary
(INPE-2889-TDL/145) Avail: NTIS HC A06/MF A01

The modelling and analysis of the attitude control system for low orbit artificial satellites, using stabilizing flaps are presented. The function of the system is to maintain the satellite aligned with the local vertical. For this purpose, the control system utilizes the aerodynamic forces acting on the flaps which create the restoring torques reorienting the satellite in line with the local vertical. The aerodynamic forces on the satellite are modelled assuming free molecular flow using the Kinetic Theory of Gases. The control system development is considered through the application of stochastic contol concepts. The satellite motion is described by the equations of motion based on Newtonian formulation. Starting from Separation Principle a sequential procedure is developed, in which the state estimation and control problems are handled simultaneously. State estimate is provided by Kalman filter by using the information about the position of the satellite and of the flaps. The controller acts on the satellite in real time, and the stabilizing flaps being the only control elements. Author

N84-26734# RAND Corp., Santa Monica, Calif.
TECHNIQUES FOR THE ANALYSIS OF SPECTRAL AND ORBITAL CONGESTION IN SPACE SYSTEMS Interim Report
A. L. Hiebert and W. Solifrey Mar. 1984 313 p
(Contract F49620-82-C-0018)
(AD-A140841; RAND/R-3046-AF) Avail: NTIS HC A14/MF A01 CSCL 22/3

This report is a compendium of the techniques available for analysis of spectral and orbital congestion in space systems. The expansion of signal transmissions and orbiting objects could severely affect the frequency spectrum allocations, orbit assignments, and related Earth segments of space systems. The treatment of these problems requires a set of analytical procedures, computer programs to apply these procedures to specific configurations, and a data base to provide inputs to the programs. The proposed Space System Data Base will consist of electromagnetic and operational characteristics of active and projected U.S. and international space systems including related Earth and airborne segments. More than 20 analysis and computation codes are described, with the presentation pitched to an engineer's or user's level. The projected capabilities will provide an essential national resource for management decision making and architectural planning on space-related programs. Author (GRA)

N84-26735# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
POPSAT: A CANDIDATE SATELLITE SYSTEM FOR SOLID EARTH APPLICATIONS AND SCIENCES. PRELIMINARY FEASIBILITY STUDY. VOLUME 1: SUMMARY Final Report
E. Achtermann, W. Denzinger, K. Enslin, W. Gilg, M. Granzow, G. Lippner, J. Munder, R. Ockert, L. Popken, H. Reffel et al Paris ESA Nov. 1983 416 p refs Prepared in cooperation with Deutsches Geodaetisches Forschunginstitut, Stuttgart Univ., Aeritalia S.p.A., Turin and Technische Univ., Munich 2 Vol. (Contract ESA-5309/83/F-CG(SC)) (ESA-CR-(P)-1882-Vol-1) Avail: NTIS HC A18/MF A01

A solid-earth satellite system performance analyses, and related tasks such as microwave tracking system definition and error assessments, gravitational and nongravitational disturbance forces and their modeling accuracies are summarized. System performance simulations demonstrate that mission requirements can be fulfilled. The most cost effective launch would be a shared launch into sun-synchronous orbit and injection with a bipropellant stage into the final orbit of 7000 km altitude. This design baseline with more stringent mass constraints led to a low mass design. The minimum achievable satellite mass of POPSAT is 550 kg. A data management concept was tailored to the POPSAT system, and a satellite design compatible with the low mass constraint was conceived. Accommodation of a LASSO derived Time Synchronization Experiment was investigated and is found to need thorough review of the mission objectives and scenario. A development program was set up and all elements related to the POPSAT system were identified and costed.
Author (ESA)

N84-26736# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
POPSAT: A CANDIDATE SATELLITE SYSTEM FOR SOLID EARTH APPLICATIONS AND SCIENCES. PRELIMINARY FEASIBILITY STUDY. VOLUME 2: DEVELOPMENT PROGRAM Final Report
E. Achtermann, W. Denzinger, K. Enslin, W. Gilg, M. Granzow, G. Lippner, J. Munder, R. Ockert, L. Popken, H. Reffel et al Paris ESA Nov. 1983 35 p Prepared in cooperation with Deutsches Geodaetisches Forscunginstitut, Stuttgart Univ., Aeritalia S.p.A., Turin and Technische Univ., Munich 2 Vol.
(Contract ESA-5309/83/F-CG(SC))
(ESA-CR(P)-1882-Vol-2) Avail: NTIS HC A03/MF A01

The development program for the POPSAT geodetic satellite to be launched in 1990 is outlined. System elements; model concept; integration and tests; and planning aspects are covered. The development of the PRARE system to validate the on board microwave tracking system, and operation of PRARE on ERS-1 to gain expertise and to test routines are particularly important. Author (ESA)

N84-26737# Technische Hogeschool, Delft (Netherlands). Section Orbital Mechanics.
ANALYSIS OF POPSAT GRAVITY MODEL ERRORS
K. F. Wakker, B. A. C. Ambrosius, and H. J. D. Piersma Paris ESA Nov. 1983 106 p refs
(Contract ESTEC-5512/83/NL-MS)
(ESA-CR(P)-1883) Avail: NTIS HC A06/MF A01

The accuracy achievable for a gravity model tailored to a future POPSAT geodetic satellite, and problems in developing such a model were studied. Simulations were performed on the recovery of a limited set of gravity coefficients from single 5-day or 10-day arcs of POPSAT tracking data, acquired with 16 ground stations. These simulations provide conservative estimates on the estimability of the gravity coefficients, on the accuracy of the recovered coefficients and on the contributions of the gravity coefficients uncertainties to errors in the orbit of POPSAT, the positions of ground stations and the pole position. Results demonstrate that, if the other geometric and dynamic models are accurate enough, it is possible to derive from a limited number of actual POPSAT tracking data arcs a tailored gravity model which satisfies POPSAT accuracy requirements after months in orbit. Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

No abstracts in this category.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-26738*# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
SPACE STRUCTURE VIBRATION MODES: HOW MANY EXIST? WHICH ONES ARE IMPORTANT?
P. C. Hughes Apr. 1984 24 p refs Sponsored by JPL, Natural Sciences and Engineering Research Council of Canada, and Canadian Department of Communications
(NASA-CR-173442; NAS 1.26:173442; UTIAS-TN-252; ISSN-0082-5263) Avail: NTIS HC A02/MF A01 CSCL 22B

This report attempts to shed some light on the two issues raised in the title, namely, how many vibration modes does a real structure have, and which of these modes are important? The surprise-free answers to these two questions are, respectively, an infinite number and the first several modes. The author argues that the absurd subspace (all but the first billion modes) is not a strength of continuum modeling, but, in fact, a weakness. Partial differential equations are not real structures, only mathematical models. This note also explains (1) that the PDE model and the finite element model are, in fact, the same model, the latter being a numerical method for dealing with the former, (2) that modes may be selected on dynamical grounds other than frequency alone, and (3) that long slender rods are useful as primitive cases but dangerous to extrapolate from. B.W.

N84-26739*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AEROTHERMAL PERFORMANCE AND DAMAGE TOLERANCE OF A RENE 41 METALLIC STANDOFF THERMAL PROTECTION SYSTEM AT MACH 6.7
Don E. Avery Jul. 1984 41 p refs
(NASA-TM-85773; L-15773; NAS 1.15:85773) Avail: NTIS HC A03/MF A01 CSCL 22B

A flight-weight, metallic thermal protection system (TPS) model applicable to Earth-entry and hypersonic-cruise vehicles was subjected to multiple cycles of both radiant and aerothermal heating in order to evaluate its aerothermal performance, structural integrity, and damage tolerance. The TPS was designed for a maximum operating temperature of 2060 R and featured a shingled, corrugation-stiffened corrugated-skin heat shield of Rene 41, a nickel-base alloy. The model was subjected to 10 radiant heating tests and to 3 radiant preheat/aerothermal tests. Under radiant-heating conditions with a maximum surface temperature of 2050 R, the TPS performed as designed and limited the primary structure away from the support ribs to temperatures below 780 R. During the first attempt at aerothermal exposure, a failure in the panel-holder test fixture severely damaged the model. However, two radiant preheat/aerothermal tests were made with the damaged model to test its damage tolerance. During these tests, the damaged area did not enlarge; however, the rapidly increasing structural temperature measuring during these tests indicates that had the damaged area been exposed to aerodynamic heating for the entire trajectory, an aluminum burn-through would have occurred. Author

N84-26740*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
NATURAL ENVIRONMENT DESIGN CRITERIA FOR THE SPACE STATION PROGRAM DEFINITION PHASE
William W. Vaughan Jul. 1984 14 p refs
(NASA-TM-82585; NAS 1.15:82585) Avail: NTIS HC A02/MF A01 CSCL 22B

The natural environment design criteria requirements for use

in the Space Station and its Elements (SSPE) definition phase studies are presented. The atmospheric dynamic and thermodynamic environments, meteoroids, radiation, physical constants are addressed. It is intended to enable all groups involved in the definition phase studies to proceed with a common and consistent set of natural environment criteria requirements. E.A.K.

N84-26741*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SELECTION OF ACTUATOR LOCATIONS FOR STATIC SHAPE CONTROL OF LARGE SPACE STRUCTURES BY HEURISTIC INTEGER PROGRAMING
Raphael Haftka (Virginia Polytechnic Inst. and State Univ.) and Howard M. Adelman Mar. 1984 29 p refs Presented at the GWU/LaRC Symp. on Advan. and Trends in Struct. and Dyn., Washington, D.C., 22-25 Oct. 1984
(NASA-TM-85769; NAS 1.15:85769) Avail: NTIS HC A03/MF A01 CSCL 22B

Orbiting spacecraft such as large space antennas have to maintain a highly accurate space to operate satisfactorily. Such structures require active and passive controls to mantain an accurate shape under a variety of disturbances. Methods for the optimum placement of control actuators for correcting static deformations are described. In particular, attention is focused on the case were control locations have to be selected from a large set of available sites, so that integer programing methods are called for. The effectiveness of three heuristic techniques for obtaining a near-optimal site selection is compared. In addition, efficient reanalysis techniques for the rapid assessment of control effectiveness are presented. Two examples are used to demonstrate the methods: a simple beam structure and a 55m space-truss-parabolic antenna. Author

N84-26742# National Aerospace Lab., Amsterdam (Netherlands). Space Div.
INERTIAL-OPTICAL ATTITUDE DETERMINATION AND MODEL FOLLOWING CONTROL OF MANEUVERING SPACECRAFT
T. Zwartbol and A. P. Terpstra 26 Aug. 1983 19 p refs Presented at 37th Symp. AGARD Guidance and Control Panel on Guidance and Control Tech. for Adv. Space Vehicles, Florence, 27-30 Sep. 1983
(Contracts NIVR-1997; NIVR-1998)
(NLR-MP-83053-U) Avail: NTIS HC A02/MF A01

An approach to on-board commanding, estimation, and control of the attitude motion of maneuvering spacecraft, based on control principles is presented. The control law is based on explicit model following. It comprises single-axis models of the spacecraft motion, which generate a target trajectory and associated target control. An algorithm for inertial-optical attitude determination and estimation of gyro parameters (drift rate bias and scale factor error) is outlined. The algorithms were validated in software simulations of an attitude control system of the type used in the Infra Red Astronomical Satellite (IRAS). The control law and state estimator were tested in-flight, in an on-board experiment with the IRAS spacecraft. The control system comprises a strapdown rate-integrating gyro and a slit-type start sensor for optical-inertial attitude sensing, a reaction wheel actuator, and a 16-bit on-board computer. Author (ESA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

N84-26743*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPACEBORNE SENSORS (1983-2000 AD): A FORECAST OF TECHNOLOGY
Theodor Kostiuk and Bill P. Clark (Computer Sciences Corp.) Apr. 1984 230 p refs
(NASA-TM-86083; NAS 1.15:86083) Avail: NTIS HC A11/MF A01 CSCL 22B

A technical review and forecast of space technology as it applies to spaceborne sensors for future NASA missions is presented. A format for categorization of sensor systems covering the entire electromagnetic spectrum, including particles and fields is developed. Major generic sensor systems are related to their subsystems, components, and to basic research and development. General supporting technologies such as cryogenics, optical design, and data processing electronics are addressed where appropriate. The dependence of many classes of instruments on common components, basic R&D and support technologies is also illustrated. A forecast of important system designs and instrument and component performance parameters is provided for the 1983-2000 AD time frame. Some insight into the scientific and applications capabilities and goals of the sensor systems is also given. M.A.C.

N84-26744# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
STUDY ON CRITICAL ASSESSMENT OF IR CCD ARRAYS FOR SPACEBORNE REFLECTED AND THERMAL IR IMAGERS Final Report
S. Devito (Elettronica S.p.A.), J. Euskirchen, B. Kunkel, and L. Cox (SIRA Ltd.) Paris ESA Dec. 1983 181 p refs
(Contracts ESTEC-5191/82/NL-GM(SC); MBB-3700/2950-R)
(ESA-CR(P)-1881) Avail: NTIS HC A09/MF A01

Development of IR detector arrays and IR CCDs was surveyed. A technology trend analysis was established in order to define the most promising techniques in the area of large IR CCD focal plane assembly techniques. The main IR CCD imaging applications and their specific detector array requirements were reviewed. Summary specifications of the most urgently needed IR CCD detector array developments are given. Author (ESA)

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-26745# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SAFETY IN THE HANDLING OF ROCKET MOTORS [SEGURANCA NO MANUSEIO DE MOTOR-FOGUTE]
Adauto Gouveia Motta Mar. 1984 48 p. refs In PORTUGUESE; ENGLISH summary
(INPE-3033-NTE/214) Avail: NTIS HC A03/MF A01

The safety rules to handling explosives, particularly, the rocket-motors and their initiators are described. The same procedures used for liquid propellants will be issued in a second volume. Author

N84-26746*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SPACE POWER TECHNOLOGY INTO THE 21ST CENTURY
Karl A. Faymon and J. Stuart Fordyce [1983] 18 p refs Presented at the Space Power Systems Technol. Conf., Costa Mesa, Calif., 5-7 Jun. 1984; sponsored by AIAA
(NASA-TM-83690; E-2144; NAS 1.15:83690) Avail: NTIS HC A02/MF A01 CSCL 21H

The space power systems of the early 21st century are discussed. The capabilities which are anticipated to evolve from today's state of the art and the technology development programs presently in place or planned for the remainder of the century are emphasized. The power system technologies considered include: solar thermal, nuclear, radioisotope, photovoltaic, thermionic, thermoelectric, and dynamic conversion systems such as the Brayton and Stirling cycles. Energy storage technologies considered

include: nickel hydrogen biopolar batteries, advanced high energy rechargeable batteries, regenerative fuel cells, and advanced primary batteries. The present state of the art of these space power and energy technologies is discussed along with their projections, trends and goals. A speculative future mission model is postulated which includes manned orbiting space stations, manned lunar bases, unmanned Earth orbital and interplanetary spacecraft, manned interplanetary missions, military applications, and Earth to space and space to space transportation systems. The various space power/energy system technologies which are anticipated to be operational by the early 21st century are matched to these missions. E.A.K.

N84-26747# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
EXPERIMENTAL EXHAUST PLUME INVESTIGATION WITH MBB 10 N BIPROPELLANT THRUSTER Final Report
G. Munding and Hauke Trinks (Hochschule der Bundeswehr, Hamburg) Paris ESA 23 Dec. 1983 103 p refs
(Contract ESTEC-4888/81/NL-AK)
(MBB-UR-558-84; ESA-CR(P)-1884) Avail: NTIS HC A06/MF A01

Literature on exhaust plumes was surveyed and experiments were performed to obtain information about plume formation, plume shape, droplet distribution, the composition of the contaminants, and the heat flux in the exhaust plume of the MBB 10 N thruster during pulse firings. Spacecraft contamination was studied. Experimental results were compared to those calculated by CONTAM computer code and a plume flow field formation model concept was derived. A long term program for exhaust plume characterizations is defined. Author (ESA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N84-26748*# Salk Institute for Biological Studies, San Diego, Calif.
NONENZYMATIC FORMATION OF ENERGY-RICH LACTOYL AND GLYCEROYL THIOESTERS FROM GLYCERALDEHYDE AND A THIOL
Arthur L. Weber [1983] 27 p refs Submitted for publication
(Grant NsG-7627)
(NASA-CR-173633; NAS 1.26:173633) Avail: NTIS HC A03/MF A01 CSCL 07A

The energy rich thioester, N-acetyl-S-lactoylcysteine, is formed under anaerobic conditions from glyceraldehyde and N-acetylcysteine at ambient temperature in aqueous solutions of sodium phosphate (pH 7.0). The conversion occurs at a rate of about 0.4% per day in reactions with 10 millimoles (mM) glyceraldehyde, 10 mM thiol, and 500 mM sodium phosphate (pH 7.0). Thioester formation proceeds at an estimated efficiency of 76%. The formation of lactoyl thioester most likely occurs by the phosphate catalyzed dehydration of glyceraldehyde to give pyruvaldehyde, which combines with thiol to form a hemithioacetal that rearranges to the thioester. A second energy rich thioester, N-acetyl-S-glyceroylcysteine, is also produced from glyceraldehyde when these reactions are carried out in the presence of oxygen and to a limited extent in the absence of oxygen. In the presence of oxygen the formation of glyceroyl thioester continues until the thiol disappears completely by oxidation. The significance of these reactions to the energetics of the origin of life is discussed.M.A.C.

N84-26749*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MICROSTRUCTURE AND ORIENTATION EFFECTS ON PROPERTIES OF DISCONTINUOUS SILICON CARBIDE/ALUMINUM COMPOSITES
David L. McDaniels and Charles A. Hoffman Jul. 1984 32 p refs
(NASA-TP-2302; E-1977; NAS 1.60:2302) Avail: NTIS HC A03/MF A01 CSCL 11D

Composite panels containing up to 40 vol % discontinuous silicon carbide SiC whisker, nodule, or particulate reinforcement in several aluminum matrices are commercially fabricated and the mechanical properties and microstructual characteristics are evaluated. The yield and tensile strengths and the ductility are controlled primarily by the matrix alloy, the temper condition, and the reinforcement content. Particulate and nodule reinforcements are as effective as whisker reinforcement. Increased ductility is attributed to purer, more uniform starting materials and to more mechanical working during fabrication. Comparing mechanical properties with those of other aluminum alloys shows that these low cost, lightweight composites demonstrate very good potential for application to aerospace structures. M.A.C.

N84-26890# Joint Publications Research Service, Arlington, Va.
SWEDEN'S STU PROPOSES FUNDING FOR METALS, CERAMICS APPROACH
In its West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 8-9 refs Transl. into ENGLISH from Tek. i Tiden (Stockholm), 1983 p 10 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

24 COMPOSITE MATERIALS

Includes laminates.

N84-26750*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
THE NONLINEAR VISCOELASTIC RESPONSE OF RESIN MATRIX COMPOSITE LAMINATES
C. Hiel, A. H. Cardon, and H. F. Brinson Washington NASA Jul. 1984 50 p refs
(Contract NCC2-71)
(NASA-CR-3772; NAS 1.26:3772; VPI-E-83-6) Avail: NTIS HC A03/MF A01 CSCL 11D

Possible treatments of the nonlinear viscoelastic behavior of materials are reviewed. A thermodynamic based approach, developed by Schapery, is discussed and used to interpret the nonlinear viscoelastic response of a graphite epoxy laminate, T300/934. Test data to verify the analysis for Fiberite 934 neat resin as well as transverse and shear properties of the unidirectional T300/934 composited are presented. Long time creep characteristics as a function of stress level and temperature are generated. Favorable comparisons between the traditional, graphical, and the current analytical approaches are shown. A free energy based rupture criterion is proposed as a way to estimate the life that remains in a structure at any time. Author

N84-26751*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OUTGASSING DATA FOR SELECTING SPACECRAFT MATERIALS
William A. Campbell, Jr., Richard S. Marriott, and John J. Park Jun. 1984 280 p refs
(NASA-RP-1124; Rept-84B0271; NAS 1.61:1124) Avail: NTIS HC A13/MF A01 CSCL 11D

Outgassing data, derived from tests at 398 K (125 C) for 24 hours in vacuum as per ASTM E 595-77, were compiled for numerous materials for spacecraft use. The data presented are the total mass loss (TML) and the collected volatile condensable materials (CVCM). The various materials are grouped as: adhesives; cable insulation and shrink tubing; conformal coating; electrical components; electrical shields; films and sheet materials, foams; greases and lubricants; lacing tape and cord cable ties; laminates and circuit boards; marking materials and inks; molding compounds; paints, lacquers, and varnishes; potting compounds; and rubbers and elastomers. The materials are also listed alphabetically.
A.R.H.

N84-26752*# Rockwell International Corp., Downey, Calif. Space Transportation and Systems Group.
REPAIR TECHNIQUES FOR CELION/LARC-160 GRAPHITE/POLYIMIDE COMPOSITE STRUCTURES Final Report
J. S. Jones and S. R. Graves Washington NASA Jun. 1984 216 p refs
(Contract NAS1-16448)
(NASA-CR-3794; NAS 1.26:3794; STS-81-0352-12) Avail: NTIS HC A10/MF A01 CSCL 11D

The large stiffness-to-weight and strength-to-weight ratios of graphite composite in combination with the 600 F structural capability of the polyimide matrix can reduce the total structure/TPS weight of reusable space vehicles by 20-30 percent. It is inevitable that with planned usage of GR/PI structural components, damage will occur either in the form of intrinsic flaw growth or mechanical damage. Research and development programs were initiated to develop repair processes and techniques specific to Celion/LARC-160 GR/PI structure with emphasis on highly loaded and lightly loaded compression critical structures for factory type repair. Repair processes include concure and secondary bonding techniques applied under vacuum plus positive autoclave pressure. Viable repair designs and processes are discussed for flat laminates, honeycomb sandwich panels, and hat-stiffened skin-stringer panels. The repair methodology was verified through structural element compression tests at room temperature and 315 C (600 F). A.R.H.

N84-26753*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FAN BLADE SHAKE TEST RESULTS FOR THE 40- BY 80-FOOT/80- BY 120-FOOT WIND TUNNEL
William Warmbrodt and Todd Graham (Beam Engineering, Inc.) Sep. 1983 340 p refs
(NASA-TM-85859; NAS 1.15:85859) Avail: NTIS HC A15/MF A01 CSCL 11D

This report documents the shake tests performed on the first set of hydulignum fan blades for the 40- by 80-/80- by 120-Foot Wind Tunnel. The purpose of the shake test program is described. The test equipment and test procedures are reviewed. Results from each shake test are presented and the overall findings of the shake test program are discussed. Author

N84-26754*# Celanese Research Co., Summit, N.J.
LIQUID CRYSTAL POLYESTER-CARBON FIBER COMPOSITES Final Report
Tai-Shung Chung May 1984 50 p refs
(Contract NAS1-15749)
(NASA-CR-172323; NAS 1.26:172323) Avail: NTIS HC A03/MF A01 CSCL 11D

Liquid crystal polymers (LCP) have been developed as a thermoplastic matrix for high performance composites. A successful melt impregnation method has been developed which results in the production of continuous carbon fiber (CF) reinforced LCP prepreg tape. Subsequent layup and molding of prepreg into laminates has yielded composites of good quality. Tensile and flexural properties of LCP/CF composites are comparable to those of epoxy/CF composites. The LCP/CF composites have better impact resistance than the latter, although epoxy/CF composites possess superior compression and shear strength. The LCP/CF composites have good property retention until 200 F (67 % of room temperature value). Above 200 F, mechanical properties decrease significantly. Experimental results indicate that the poor compression and shear strength may be due to the poor interfacial adhesion between the matrix and carbon fiber as adequate toughness of the LCP matrix. Low mechanical property retention at high temperatures may be attributable to the low beta-transition temperature (around 80 C) of the LCP matrix material. Author

N84-26755*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ICAN: INTEGRATED COMPOSITES ANALYZER
P. L. N. Murthy and C. C. Chamis 1984 25 p refs Presented at the 25th Struct., Struct. Dyn. and Mater. Conf., Palm Springs, Calif., 14-16 May 1984; sponsored by the AIAA, ASME, ASCE and AHS
(NASA-TM-83700; E-2158; NAS 1.15:83700) Avail: NTIS HC A02/MF A01 CSCL 11D

The ICAN computer program performs all the essential aspects of mechanics/analysis/design of multilayered fiber composites. Modular, open-ended and user friendly, the program can handle a variety of composite systems having one type of fiber and one matrix as constituents as well as intraply and interply hybrid composite systems. It can also simulate isotropic layers by considering a primary composite system with negligible fiber volume content. This feature is specifically useful in modeling thin interply matrix layers. Hygrothermal conditions and various combinations of in-plane and bending loads can also be considered. Usage of this code is illustrated with a sample input and the generated output. Some key features of output are stress concentration factors around a circular hole, locations of probable delamination, a summary of the laminate failure stress analysis, free edge stresses, microstresses and ply stress/strain influence coefficients. These features make ICAN a powerful, cost-effective tool to analyze/design fiber composite structures and components. A.R.H.

N84-26756*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INTERPLY LAYER DEGRADATION EFFECTS ON COMPOSITE STRUCTURAL RESPONSE
Christos C. Chamis and George C. Williams [1983] 30 p Presented at the 25th Struct., Struct. Dyn. and Mater. Conf., Palm Springs, Calif., 14-16 May 1984; cosponsored by AIAA, ASME, ASCE, and AHS
(NASA-TM-83702; E-2160; NAS 1.15:83702) Avail: NTIS HC A03/MF A01 CSCL 11D

Recent research activities at NASA Lewis Research Center to computationally evaluate the effects of interply layer progressive weakening (degradation) on the structural response of a composite beam are summarized. The structural responses of interest include: (1) bending, (2) buckling, (3) free vibrations, (4) periodic excitation, and (5) impact. Finite element analysis was used for the computational evaluations. The interply layer degradation effects on the various structural responses were determined and assessed as a function of the interply layer modulus varying from 1 million psi down to 1000 psi and even lower for some limiting cases. The results obtained show that the interply layer degradation has generally negligible effects on composite structural response and, therefore, structural integrity, unless the interply layer modulus degrades to about 10,000 psi or less. Author

N84-26757# Army Materials and Mechanics Research Center, Watertown, Mass.
ROLL-TRUSION (RT*) OF COMPOSITE STRUCTURES Final Report
J. R. Plumer, M. A. Yates, and S. B. Driscoll Aug. 1983 23 p
(DA Proj. 1T1-61101-A-91-A)
(AD-A140838; AMMRC-TR-83-49) Avail: NTIS HC A02/MF A01 CSCL 11/4

A program was conducted to assess the feasibility of Roll-Truding (RT*) fiber-reinforced composite structures. The primary objective of this effort was to develop a processing method for continuous profiles of fiber-reinforced/epoxy matrix composites that could significantly increase production rates obtainable by pultrusion. The concept of Roll-Trusion (RT*) or pull-forming centers on the use of pf heated rollers was to: (1) feed the stock material, (2) form the profile shape, and (3) provide the heat required for curing of the thermosetting resin. A bench model Roll-Truder (RT*) apparatus was constructed; 1-inch wide glass/epoxy and graphite/epoxy specimens were successfully produced. Author (GRA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N84-26758# Army Armament Research and Development Command, Dover, N. J.

THEORETICAL CALCULATIONS OF H(2) CARS SPECTRA FOR PROPELLANT FLAMES

Joanne Fendell, L. E. Harris, and Kenneth Aron Dec. 1983 29 p refs

(DA Proj. 1L1-62122-AH-60)

(AD-A135818; AD-E401112; ARLCD-TR-83048) Avail: NTIS HC A03/MF A01 CSCL 07/4

Having assigned the transitions, the third order susceptibility, which gives a model for data reduction of CARS spectra can be calculated. Temperature and concentration for a given species can be obtained by comparing the theoretical spectra with experimental results. High energy pure rotational H(2) CARS transitions have recently been observed in several spectral regions, most notably, the NO and CO CARS regions H(2) CARS is of interest because hydrogen is a major combustion product of propellants, especially nitramine propellants. For this reason, calculations were performed to assign the observed H(2) transitions. For this particular case, the calculations of interest are for the observed S- and Q-branch transition of H(2) for v equal to 0 and 1. Spectroscopic constants available in the literature and the results of an ab initio calculation performed by Ermler were used in the analysis. Ermler used the potential energy curves for the ground state of hydrogen calculated by Kolos and Wolniewicz over a range of 0.4 < or = R < or = 10.0 a.u. as the basis for this calculation. The result is a set of spectroscopic constants superior to any other set examined. GRA

N84-26759# Evans (Charles) and Associates, San Mateo, Calif.

DEVELOPMENT AND APPLICATION OF SIMS (SECONDARY ION MASS SPECTROMETRY) CHARACTERIZATION TECHNIQUES FOR THE STUDY OF IMPURITIES AND IMPURITY MOTION IN (HgCd)Te AND CdTe Semiannual Technical Report, 1 May - 1 Nov. 1983

C. A. Evans, Jr. 1 Nov. 1983 10 p

(Contract MDA903-82-C-0427; ARPA Order 4606)

(AD-A140712) Avail: NTIS HC A02/MF A01 CSCL 07/4

The broad objectives of this program are: (1) to develop quantitative analytical procedures for the application of high performance secondary ion mass spectrometry (SIMS) to the analysis of CdTe and (HgCd)Te for trace element and major constituent characterization, particularly Hg; and (2) to perform materials directed research in order to better understand the incorporation and redistribution of impurity elements in CdTe and (HgCd)Te. GRA

N84-26760# Chemical Dynamics Corp., Columbus, Ohio.

PREDICTION OF THERMAL RATE CONSTANTS FOR COMBUSTION REACTION Final Report, 9 Mar. 1981 - 8 Mar. 1984

B. C. Garrett 1984 12 p

(Contract DAAG29-81-C-0015)

(AD-A140736; ARO-18172.25-CH-S) Avail: NTIS HC A02/MF A01 CSCL 07/4

The goal of the research carried out on this contract is the development of theoretical methods which will aid in the interpretation and modeling of gas phase combustion processes. The methods are based upon variational transition state theory (VTST), which has been shown to be an efficient method of computing accurate rate constants for gas phase reactions. The study of gas phase reactions is an important step toward understanding complicated mechanisms of the combustion of energetic materials. Also, gas phase rate data are needed as input for models of these combustion mechanisms. The limitations in the accuracy of VTST arise from: (1) a breakdown of the fundamental dynamical assumption of TST, (2) the ad hoc manner in which quantum mechanical effects are included in VTST, (3) the approximate methods for including anharmonic effects, and (4) inaccuracies in the potential energy surface information used as input into the theory. The major part of the research on this contract has included extension of the methods to surmount these limitations, validation of the new methods by testing them against accurate quantum mechanical methods on model collinear reactions, and extension of the methods to treat realistic reactions involving polyatomic molecules. GRA

N84-26761# Battelle Columbus Labs., Ohio.

PREDICTION OF TRANSITION STATES AND THERMOCHEMISTRY FOR COMBUSTION REACTIONS Final Report, 4 Aug. 1980 - 31 Dec. 1983

Rodney J. Bartlett 7 Apr. 1984 109 p Prepared in cooperation with Florida Univ. Gainesville, FL

(Contract DAAG29-80-C-0105; DAAG29-82-K-0034)

(AD-A140738; ARO-16929.4-PH; ARO-18936.4-PH) Avail: NTIS HC A06/MF A01 CSCL 07/4

Ab initio quantum chemistry methods based upon many-body perturbation theory (MBPT) and coupled-cluster (CC) theory have been developed and applied to potential energy surfaces for transient molecules. Studies included decomposition pathways for formaldehyde, methanol, the formyl radical and the inorganic radical HIF. MBPT/CC methods were extended to include effects of triple-excitations and comparisons made with full CI for HF, BH, NH3 and H20. The high accuracy of MBPT/CC has been demonstrated. GRA

N84-26762# Hebrew Univ., Jerusalem (Israel). Inst. of Chemistry.

SYNTHESES AND CHARACTERIZATION OF NOVEL GRAPHITE INTERCALATION COMPOUNDS WITH INORGANIC FLUORIDES Final Scientific Report, 15 Sep. 1982 - 31 Dec. 1983

H. Selig Dec. 1983 43 p

(Grant AF-AFOSR-0167-80; AF Proj. 2306)

(AD-A140801; AFOSR-84-0263TR) Avail: NTIS HC A03/MF A01 CSCL 07/2

Previous reported intercalation compounds of graphite and xenon fluorides and halogen fluorides were synthesized with HOPG as starting material. While the course of intercalation was followed by in situ measurements such as electrodeless conductivity, c-axis expansion and X-ray diffraction, one of the main objectives of the syntheses was to prepare suitable materials for conducting physical measurements such as those carried out by ongoing projects on those materials sponsored by the USAF. These included studies of thermal properties, vibrational spectroscopy and microstructure. Special attention was devoted to the syntheses of new binary and ternary intercalation compounds of graphite with inorganic fluorides in order to determine by chemical or physical means the chemical species existing in the intercalates. Author (GRA)

N84-26763# Texas A&M Univ., College Station. Dept. of Chemistry.

LUMINESCENCE TITRATIONS OF POLYELECTROLYTES

E. R. Alvarez-Roa, N. E. Prieto, and C. R. Martin 1 May 1984 34 p

(Contract N00014-82-K-0612)

(AD-A140823; TR-5) Avail: NTIS HC A03/MF A01 CSCL 07/4

When an anionic polyelectrolyte is added to a solution of a cationic lumophore (the probe), binding of the probe ions to the anionic sites on the polymer chain can occur. We have found that in some cases, this binding results in an increase in the probe's quantum yield for emission. This paper explores the possibility of exploiting this effect in luminescence titrations for determination of either the equivalent weight (EW) of a polyanion or the concentration of the polyanion in solution (if the EW is known). A suitable probe cation is identified and luminescence titration curves for a variety of polyanions are presented. The luminescence titration procedure was found to produce precisions

of better than 5% and accuracies of better than 1% in titrations of the Na(+) salt forms of hydrophobic polyanions. Author (GRA)

N84-26764# Texas A&M Univ., College Station. Dept. of Chemistry.
ION EXCHANGE SELECTIVITY OF NAFION FILMS ON ELECTRODE SURFACES
M. N. Szentirmay and C. R. Martin 1 May 1984 35 p
(Contract N00014-82-K-0612)
(AD-A140824; TR-4) Avail: NTIS HC A03/MF A01 CSCL 07/4

Films of 1100 EW Nafion were coated onto glassy carbon electrode surfaces and these chemically modified electrodes were used to characterize the ion exchange selectivity of the polymer. This was accomplished by allowing electrodes to equilibrate with solutions of various electroactive counterions and then determining the quantity of ion incorporated into the films coulometrically. These data were used to calculate both ion exchange partition and selectivity coefficients. Ion exchange selectivity coefficients (vs. Na(+)) for hydrophobic, organic counterions were very large (10,000 to 6 x 6,000,000) confirming earlier work which suggested that Nafion preferentially incorporates such counterions. The implications of this unusual ion exchange selectivity to electroanalysis are discussed. Author (GRA)

N84-26765# Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
HIGH TEMPERATURE OXIDE ELECTROLYTES FOR THE SPLITTING OF WATER--THE ROC PROCESS Technical Report, 1 Jul. 1982 - 31 Oct. 1984
E. A. Fletcher, R. B. Diver, and J. E. Noring 5 Apr. 1984 17 p
(Contract N00014-82-K-0523)
(AD-A140881; AD-E500637; TR-4) Avail: NTIS HC A02/MF A01 CSCL 07/4

Solid oxygen passing membranes such as stabilized zirconia have been proposed for use as membranes in high temperature water splitting processes. This paper describes two-membrane systems, ROCs, which use a hydrogen passing membrane as well. An advantage of a two-membrane system is that water may be split in a single passage through the device, thus decreasing substantially thermodynamic losses associated with the heat exchanger and other appurtenances. Some problems such as the stability of hydrogen passing membranes in a water atmosphere are addressed. It is suggested that the ROC process may provide a means of protecting hydrogen passing membranes, and that electric ROCs may be unusually well suited for operation at temperatures at which palladium membranes might be used. The thermal efficiencies of two membrane systems with and without electrical enhancement are compared. GRA

N84-26766# Illinois Univ., Urbana. Dept. of Chemistry.
EXCIPLEX IONIC DISSOCIATION IN NON-POLAR SOLVENT INDUCED BY MULTIPOLAR SALT COMPLEXES
B. E. Goodson and G. B. Schuster 26 Apr. 1984 15 p
(Contract N00014-76-C-0745)
(AD-A140919) Avail: NTIS HC A02/MF A01 CSCL 07/4

The exciplex formed from pyrene and 1,4-dicyanobenzene in dimethoxy-ethane solution is quenched by tetra-n-butylammonium tetrafluoroborate. Stern-Volmer analysis reveals that the salt is a more effective quencher at low concentrations than at high concentrations. Related non-linear effects are observed when the yield of radical ions formed by reaction of the salt with the exciplex is determined by laser transient absorption spectroscopy. Very little pyrene radical cation is formed at low salt concentration even though significant exciplex quenching occurs. These effects are a consequence of association of the salt to form a quadrupolar dimer from a dipolar monomer. The quadrupole quenches the exciplex and leads to the generation of radical ions, and the dipole quenches but does not give ions. We have demonstrated that the radical ions resulting from quadrupolar quenching are capable of undergoing characteristic chemical reactions. Author (GRA)

N84-26767# Centre National de la Recherche Scientifique, Orleans (France). Centre de Recherches sur la Chimie de la Combustion et des Hautes Temperatures.
ADSORPTION OF HYDROCYANIC ACID ON LEWIS ACID SITES OF SILICON DIOXIDE [ADSORPTION DE L'ACIDE CYANHYDRIQUE SUR LES SITES ACIDES DE LEWIS DE LA SILICE]
J. C. Petit and H. James 1983 8 p refs In FRENCH Presented at Assoc. Franc. de Calorimetrie et d'Anal. Therm. (S.C.F.) Journees de la Gaillade: Calorimetrie et Anal. Tech., 16-17 May 1983
Avail: NTIS HC A02/MF A01

The interaction of HCN with SiO2 in the absence of cyanogen was studied. Reversible adsorption of HCN is correlated with Lewis acid sites on silica degassed at 1000 C. The acid sites react with the HCN from temperatures of 192 C upwards. Author (ESA)

N84-26768# Environmental Sciences Research Lab., Research Triangle Park, N.C. Environmental Sciences Research Lab.
ATMOSPHERIC VOLATILE HYDROCARBON COMPOSITION AT FIVE REMOTE SITES IN NORTHWESTERN NORTH CAROLINA
Robert L. Selia, Robert R. Arnts, and James W. Buchanan (Applachian State Univ.) Apr. 1984 20 p refs
(PB84-177930; EPA-600/D-84-092) Avail: NTIS HC A02/MF A01 CSCL 07D

The volatile hydrocarbon composition of the atmosphere is studied. Samples are collected in stainless steel canisters and analyzed for C2 to C-12 hydrocarbons by gas chromatography with flame ionization detection. The nonmethane total hydrocarbon concentrations at the remote sites range from 32 to 132 parts per billion carbon. Isoprene and alpha pinene display a distinct seasonal variation related to ambient temperature; whereas, acetylene and the sum of paraffins, olefins, and aromatics show no seasonal variation. GRA

N84-26769# Delaware Univ., Newark. Dept. of Chemical Engineering.
MASS TRANSFER AND THERMODYNAMIC STUDIES OF EVAPORATIVE FREEZING OF WATER Final Report
R. L. Pigford 25 Jun. 1983 37 p refs
(Contract DI-14-34-0001-8527)
(PB84-153501; OWRT-C-80180-S(8527)(1)) Avail: NTIS HC A03/MF A01 CSCL 07A

Some of the key technical problems inherent in the design of equipment for the absorption, freezing, vapor-compression process for the production of pure water from salt water were investigated in laboratory studies. These include the comparison of various solvents for water vapor in the freezer-absorber unit, the determination of water mass transfer rates into concentrated salt solution in the refrigerated absorber, and the measurement of mass transfer coefficients for the absorption of water into a solvent stream that flows over horizontal tubes. The results show that changes of the solvent can have only a small effect on the power required and that the resistance to heat transfer in the absorber has a greater effect than the resistance to mass transfer. Accumulation of air in the absorber vapor can be important. GRA

N84-26770# SRI International Corp., Menlo Park, Calif. Materials Research Lab.
ELEMENTARY PROCESSES IN THE CATALYTIC COMBUSTION OF METHANE (MECHANISM, INTERMEDIATES AND CONTROLLING REACTIONS) Annual Report, Oct. 1982 - Sep. 1983
Henry Wise Dec. 1983 42 p refs
(Contract GRI-5081-360-0490; SRI Proj. PHY-3671)
(PB84-181965; GRI-83/0069) Avail: NTIS HC A03/MF A01 CSCL 21D

The surface reactions involved in the catalytic oxidation of methane are investigated using single crystal metal surfaces and supported metal crystallites. Transient techniques are used to explore the role of reaction intermediates. The decomposition of methanol and formaldehyde is studied to identify possible surface species involved in methane oxidation. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N84-26771# British Library Lending Div., Boston Spa (England).
KINETICS OF CORROSION OF ALLOYS OF VANADIUM-CHROMIUM SYSTEM IN PHOSPHORIC ACID
O. V. Travin and E. I. Isakova 29 Mar. 1984 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Met. (USSR), no. 7, 1983 p 115-117
(BLL-M-35560-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The possibility of using alloys of the vanadium-chromium system as materials for the vaporized metal coating of pump components was investigated with the aim of increasing the corrosion and abrasion resistance of pumps used for pumping phosphoric acid. The resistance of the examined alloys in phosphoric acid was estimated from the mass losses. Long-term tests were conducted with and without agitation of the aggressive medium. Results of calculation of the rates of corrosion of V-Cr alloys using given equations are in good agreement with experimental values. Author

N84-26772# British Library Lending Div., Boston Spa (England).
USE OF REFRACTORY COATINGS TO PROTECT METAL GAINST HIGH-TEMPERATURE CORROSION
E. N. Shebanits, E. N. Grishina, P. N. Zinoev, T. D. Kvacheva, and L. L. Bragina 29 Mar. 1984 4 p ref Transl. into ENGLISH from Stal (USSR), no. 7, 1983 p 44-45
(BLL-M-35543-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The Khar'kov Polytechnical Institute has developed an unsintered coating in conjunction with the Il'ich Iron- and Steelworks for the protection of readily oxidized steels (ferritic class) against high temperature corrosion, the mixture consisting of high silica mortar, electrofiltered fireclay, commercial silica and sodium polyphosphate. The mixture is self-sintering and provides protection up to 1350 C. Author

N84-26773# British Library Lending Div., Boston Spa (England).
CHANGE IN SURFACE OF MOLYBDENUM TRIOXIDE DURING ITS EVAPORATION IN AN INERT ATMOSPHERE
E. Yu. Zamalin and G. Ya. Meshcheryakov 29 Mar. 1984 8 p refs Transl. into ENGLISH from Izv. (USSR) p 1-4
(BLL-M-35552-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The mechanism of the change that occurs in the surface of molybdenum trioxide during evaporation is discussed in the light of an experimental investigation and published data. The experiments involved evaporation of the oxide in a stream of helium at various temperatures with measurement of the surface. Further experiments were carried out with preliminary holding of the oxide at a temperature of 300 C, at which the surface processes were still slow and desorption of gases could go almost to completion. The evaporation mechanism is represented by the following elementary steps: formation of self-adsorbed molecules of oxide on account of oxygen adsorbed from the gas phase; emergence of atoms of oxide and metal into the self-adsorbed position; migration of the atoms and their active collision on the surface to form (MoO3) polymers; desorption of polymers from the surface and their diffusion into the gas phase. Author

N84-26774# British Library Lending Div., Boston Spa (England).
IMPROVEMENT OF HEAT TREATMENT OF TUBES OF STEEL 15Kh5M
O. S. Vilyams, T. M. Kovalchuk, and L. M. Kats 29 Mar. 1984 5 p Transl. into ENGLISH from Stal (USSR) p 64-65
(BLL-M-35545-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

An investigation was conducted on 50 x 5 mm press forged tubes to find a heat treatment schedule that would eliminate the surface carburizing occurring during press forging of the tubes and guarantee the ductility required for subsequent cold working. The microstructure, the microhardness of the structural components, and the mechanical properties were studied on specimens in different states. A heat treatment schedule is proposed which reduces variation in tensile strength, improves the workability of the tubes, and eliminates the need for secondary heat treatment. Author

N84-26775# British Library Lending Div., Boston Spa (England).
EXPERIMENTAL STUDY OF IMMISCIBILITY IN METALLURGICAL SYSTEMS
Yu. I. Upochkin, V. A. Mendelev, V. A. Grigoryan, and S. V. Vestfal 29 Mar. 1984 6 p refs Transl. into ENGLISH from Izv. (USSR) p 5-8
(BLL-M-35553-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Immiscibility in systems of metallurgical interest is considered and experiments on the Fe-Mn-S system, which was chosen as being relatively easy, are described. Laboratory heats were prepared and the solidified ingots were examined chemically and metallographically. From the results obtained the closed immiscibility region on an isothermal section of the diagram was constructed. An experimental indication of immiscibility is the appearance of coarse globular inclusions in which all three components are present, and this probably applies also to the general Fe-O-R system. Author

N84-26776 Electrical Research Association, Leatherhead (England).
CORROSION OF ALUMINIUM CAUSED BY ALTERNATING CURRENT
K. Vogtli 15 Jun. 1984 16 p refs Transl. into ENGLISH from Tech. Mitt. PTT (West Germany), v. 48, no. 11, 1970 p 466-477
(BLL-ERA-Trans-2920) Avail: Issuing Activity

The corrosion of aluminum electrodes by Alternating Current (AC) is studied. Extruded aluminum wire placed in an electrolyte solution with a small AC current flow does not exhibit significant corrosion in the form of pinholes. Greater current densities yield more corrosion products on the element. M.A.C.

N84-26777 Georgia Inst. of Tech., Atlanta.
CORROSION BEHAVIOR OF ION PLATED FILMS Ph.D. Thesis
George Doll Paul, Jr. 1983 130 p
Avail: Univ. Microfilms Order No. DA8405602

Nickel films were ion plated by a gasless technique upon iron substrates. Film microstructures were examined by fracture methods, X-ray metallography, optical microscopy, and transmission electron microscopy of replicas. Ion plated corrosion specimens were compared with bulk nickel and iron for performance in sodium borate-boric acid buffer solutions and in chlorides. Ni films showed a primary morphological dependence upon substrate temperature during deposition which was responsible for grain size, texture (fiber axis), and fracture appearance. Corrosion potentials and corrosion current densities of Ni ion plated Fe were insensitive to film morphology in pH 8.5 borate buffer solutions. Cathodic Tafel constants for these specimens were similarly unaffected in this solution by film morphology. Ni ion plated of the Zone 3 morphology showed significantly different behavior in chloride-injected borate buffer solutions than other plated film morphologies. Lower passive current densities and more noble pitting potentials were characteristics. Despite these facts, no ion plated Ni coating had pitting potentials as noble as bulk Ni. Dissert. Abstr.

N84-26778 Carnegie-Mellon Univ., Pittsburgh, Pa.
HYDROGEN EFFECTS ON CLEAVAGE FRACTURE IN FULLY PEARLITIC 1080 STEEL Ph.D. Thesis
John Joseph Lewandowski 1983 260 p
Avail: Univ. Microfilms Order No. DA8406446

How hydrogen may assist, or induce cleavage fracture in fully pearlitic 1080 steel was investigated. Hydrogen charging at 10 A/sq m produced embrittlement, the severity of which varied with each test temperature/microstructure/loading/rate/specimen geometry combination. The primary effect of hydrogen in the notched bend

tests was to promote sub-notch initiation (enhanced nucleus formation) either at or parallel to alpha/Fe3C interfaces, while subsequent propagation depended on the test conditions. Pre-charged hydrogen did not appear to enhance flow localization at low strains in any of the specimen geometries tested, although localization at higher strains appeared to be enhanced by hydrogen in the plane strain and cylindrical tensile specimens. In all cases, negligible embrittlement was obtained by testing at temperatures low enough to reduce both the diffusivity of hydrogen and plasticity of the material. No single embrittlement mechanism appeared to consistently describe the observed embrittlement trends.
Dissert. Abstr.

N84-26779 British Aerospace Aircraft Group, Kingston-upon-Thames (England).
FURTHER THOUGHTS ON SHOT PEENING (AND OTHER COMPRESSION INDUCING SURFACE TREATMENTS) FOR FATIGUE ENHANCEMENT
C. L. Bore 11 Apr. 1983 15 p refs
(BAE-KRS-N-GEN-275) Avail: Issuing Activity

It is shown that the effects of treatments which induce compressive strain in the surface layers of components can be understood by considering the detailed stress distribution. For plain sheet or plate specimens in aluminum alloy, the tensile stress in the specimen core can approach 55,000 lb/sq in when the ratio of core area to surface layer area is small, in which case the compressive stress in the surface layer reduces greatly. The criterion for fatigue crack initiation in such cases is the compound stress equivalence, since there are substantial orthogonal principal stresses near the junction of the surface layer and the core material.
Author (ESA)

N84-26780 Istituto di Ricerche Breda S.p.A., Milan (Italy).
TECHNOLOGICAL EFFECTS OF PRESSURE VESSEL MANUFACTURING PROCESSES ON STEEL PROPERTIES Final Report
E. Gherlardoni and V. Mandorini Luxembourg EEC 1982 152 p refs In ITALIAN; ENGLISH summary
(Contract EEC-6210-74/4/402)
(EUR-7614) Copyright. Avail: Issuing Activity

Changes in the mechanical properties of a heavy-section A 533 gr. B steel plate due to the various working stages involved in pressure vessel manufacturing process were examined. The effects of warm rolling, cold rolling, stress relieving after cold rolling, cladding, and multipass submerged arc butt welding operations were investigated. The influence of working parameters such as temperature or rolling strain, stress relieving dwell periods etc., on the strength properties of the plate were estimated at every single stage. The results could represent a basis for evaluating the manufacturing cycle in order to optimize the mechanical characteristics of the final product.
A.R.H.

N84-26781 Istituto di Ricerche Breda S.p.A., Milan (Italy).
STRESS CORROSION RESISTANCE OF STRUCTURAL STEELS IN HIGH CHLORIDE ENVIRONMENTS Final Report [RESISTENZA ALLA CORROSIONE SOTTO TENSIONE DI ACCIAI STRUTTURALI IN AMBIENTE AD ALTO TENORE DI CLORURI]
G. Casarini and M. Bianchi Luxembourg Commission of the European Communities 1982 47 p refs In ITALIAN; ENGLISH summary
(Contract EEC-6210-KB/401)
(EUR-7435) Copyright. Avail: Issuing Activity

Fracture mechanics methods and concepts were used to study the behavior to stress corrosion in seawater, acidified or not and with or without sulphide ions' pollution, a carbon steel (ASA 52 - sigma (S) approximately 350 MPa) and a low-alloy steel (ASA 64 T - sigma (S) approximately 500 MPa). The performed tests showed that the ASA 52 is not affected by stress corrosion in the selected testing conditions. Cracks propagated on the ASA 64T in acidified seawater, with and without hydrogen sulphide, only when submitted to thermal treatment suitable for simulating the HAZ structure. Because the cracks propagated in the only acidified seawater, the attack mechanism must be attributed to hydrogen stress cracking phenomena, enhanced by hydrogen sulphide.
A.R.H.

N84-26782 National Physical Lab., Teddington (England). Div. of Materials Applications.
THE DENSITY OF LIQUID SLAGS CONTAINING IRON OXIDE
B. J. Keene Feb. 1984 60 p refs
(NPL-DMA(A)-75; ISSN-0143-7313) Copyright. Avail: Issuing Activity

Data on density measurements of slags associated with basic oxygen steelmaking (BOS) are reviewed. Physicochemical properties of slag systems relevant to the mathematical modeling of the BOS process are considered. The Fex0 and binary systems; ternary systems, quaternary systems; and complex slags are covered.
Author (ESA)

N84-26783*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF ALLOY COMPOSITION ON CYCLIC FLAME HOT-CORROSION ATTACK OF CAST NICKEL-BASE SUPERALLOYS AT 900 DEG C
Daniel L. Deadmore Jul. 1984 30 p refs
(NASA-TP-2338; E-2009; NAS 1.60:2338) Avail: NTIS HC A03/MF A01 CSCL 11F

The effects of Cr, Al, Ti, Mo, Ta, Nb, and W content on the hot corrosion of nickel base alloys were investigated. The alloys were tested in a Mach 0.3 flame with 0.5 ppmw sodium at a temperature of 900 C. One nondestructive and three destructive tests were conducted. The best corrosion resistance was achieved when the Cr content was > 12 wt %. However, some lower-Cr-content alloys (< 10 wt%) exhibited reasonable resistance provided that the Al content alloys (< 10 wt %) exhibited reasonable resistance provided that the Al content was < 2.5 wt % and the Ti content was < Aa wt %. The effect of W, Ta, Mo, and Nb contents on the hot-corrosion resistance varied depending on the Al and Ti contents. Several commercial alloy compositions were also tested and the corrosion attack was measured. Predicted attack was calculated for these alloys from derived regression equations and was in reasonable agreement with that experimentally measured. The regression equations were derived from measurements made on alloys in a one-quarter replicate of a 2(7) statistical design alloy composition experiment. These regression equations represent a simple linear model and are only a very preliminary analysis of the data needed to provide insights into the experimental method.
A.R.H.

N84-26784# Materials Research Labs., Melbourne (Australia). Metallurgy Div.
INFLUENCE OF CONTAINER INTERACTIONS ON THE VAPORIZATION THERMODYNAMICS OF NICKEL
Peter L. Mart [1983] 48 p refs
(MRL-R-884; AR-003-295) Avail: NTIS HC A03/MF A01

High-temperature mass spectrometric measurements, in conjunction with metallographic studies, were used to determine how the interactions between the nickel and various refractory containers encountered high-temperature Knudsen cell vaporization systems influence the vaporization thermodynamics of nickel. Results show that graphite is an unsuitable container for molten nickel due to a substantial solubility of graphite in nickel. Under these circumstances, the nickel activity and its enthalpy of vaporization are significantly reduced in comparison to pure nickel. Recrystallized alumina and stabilized zirconia refractories did not react with molten nickel. Only zirconia was stable towards the molybdenum and tungsten Knudsen cell jackets. Containers suitable for studying the thermodynamic properties of nickel-aluminum and nickel-aluminum-platinum alloys are recommended. These alloy systems constitute the aiuminide protective coatings applied to hot end components of gas turbines.
A.R.H.

N84-26785*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
P/M SUPERALLOYS: A TROUBLED ADOLESCENT?

R. L. Dreshfield and H. R. Gray 1984 23 p refs Presented at P/M 1984, Toronto, 17-22 Jun. 1984; sponsored by Metal Powder Industries Federation
(NASA-TM-83623; E-2057; NAS 1.15:83623) Avail: NTIS HC A02/MF A01 CSCL 11F

The history of powder metallurgy P/M superalloy technology is reviewed with a comment on the state of the art, and speculates on the technology's future potential growth and maturity. M.A.C.

N84-26786# Army Armament Research and Development Command, Watervliet, N. Y.
CHARACTERIZATION OF CRYSTALLOGRAPHIC STRUCTURE AND INTERNAL STRESS OF CHROMIUM COATINGS PLATED UNDER CURRENT INTERRUPTIONS Final Report
G. P. Capsimalis and E. S. Chen Sep. 1983 15 p refs
(DA Proj. 1A1-28150-1A-1A)
(AD-A136118; ARLCB-TR-83033) Avail: NTIS HC A02/MF A01 CSCL 11/6

The effect of interrupted current (IC) plating on the visual crack morphology, crystallography, and residual stresses of electrodeposited chromium has been investigated. Varying the process parameters such as the on/off plating cycle and current density resulted in changing the crystallographic fiber texture of the deposit from the conventional < 111 > orientation to a combination of < 211 >, < 111 >, and small fraction of randomly oriented crystallites. Under these plating conditions, it was also found that: (1) lower amounts of chromium hydride (CrHx) occur in the deposit, (2) a large decrease in the microcrack density of the deposit occurs, and (3) the deposits tend to become compressively stressed. GRA

N84-26787*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SOME FUNDAMENTAL ASPECTS OF SOLIDIFICATION IN A SUPERCOOLED MELT
V. Laxmanan (Case Western Reserve Univ., Cleveland) [1983] 7 p refs To be presented at the 5th Conf. on Rapid Quenching and Solidification of Metals (RQ5), Wurzburg, West Germany, 3-7 Sep. 1984
(NASA-TM-83714; E-2153; NAS 1.15:83714) Avail: NTIS HC A02/MF A01 CSCL 11F

A model of dendritic growth in both supercooled pure and alloy melts is presented. In a pure melt, dendrite morphology is determined by the value of the dimensionless parameter sigma = 2 alpha (L)d(o)/sq Rr(t) whereas, in an alloy melt it is determined by the parameter sigma = 2 lambda (c)D(L)/sq Rr(t). The application of the above analysis to cylindrical and spherical growth morphologies obtained in highly supercooled melts has been discussed. An upper and lower bound for the particle or tip radius in this case has been obtained in terms of the growth rate and the initial bath supercooling. Author

N84-26788# Army Construction Engineering Research Lab., Champaign, Ill.
DEVELOPMENT OF CONCEPTS FOR CORROSION ASSESSMENT AND EVALUATION OF UNDERGROUND PIPELINES Final Report
A. Kumar, E. Meronyk, and E. Segan Apr. 1984 48 p
(DA Proj. 4A1-62731-AT-41)
(AD-A140633; CERL-TR-M-337) Avail: NTIS HC A03/MF A01 CSCL 13/11

Underground corrosion of pipelines is best controlled by taking advantage of the synergistic effects that are developed when protective coatings are used in conjunction with cathodic protection. When these techniques are not used during pipe installation, or the corrosion control system deteriorates with age, leaks and failures result. These failures require maintenance, which involves economic analysis of repair or replace options. This report discusses the development of several new techniques for assessing and predicting the status of underground pipe corrosion. The polarization decay principle is a nondestructive technique which can determine corrosion status without having to dig up the pipe. The Corrosion Status Index Prediction Reports show quantification and prediction of corrosion damage. Concepts for computerized and manual corrosion management systems have been developed which will enable the Facilities Engineer to determine the most cost-effective options for repairing or replacing damaged pipe. GRA

N84-26789# Southwest Research Inst., San Antonio, Tex.
STUDY OF THE INFLUENCE OF METALLURGICAL FACTORS ON FATIGUE AND FRACTURE OF AEROSPACE STRUCTURAL MATERIALS Annual Scientific Report, 1 Jan. - 31 Dec. 1983
J. Lankford, D. L. Davidson, G. R. Leverant, and J. E. Hack Feb. 1984 47 p
(Contract F49620-83-C-0054; AF Proj. 2306)
(AD-A140659; SWRI-06-7436; AFOSR-84-0253TR) Avail: NTIS HC A03/MF A01 CSCL 11/6

This report summarizes the results of a two-phase study involving experimental characterization and analytical modeling of fatigue crack tip micromechanics in aerospace structural (Al and Ti) alloys, and identification and modeling of key factors controlling subcritical crack growth and unstable fracture in single crystal nickel-base superalloys. Crack tip opening displacement, the increment of crack advance, and crack tip strain are assumed to be dependent on the formation of slip lines at the crack tip. Slip line length and dislocation density are parameters in the model which are controlled by the microstructure. The model may be used in two ways: to predict the increment of crack growth, if the slip line length is known, or the length of the slip line may be determined if the crack growth increment is measured. Crack tip plasticity data for 7075-T651 is used to evaluate the model, and the results obtained are compatible with the assumptions, and give a value of slip line length which is compatible with the mean free slip length in the material. In the single crystal nickel-base superalloy task, the details of anisotropic fracture mechanics and crack tip stress field solutions have been reviewed. GRA

N84-26790# Westinghouse Defense and Electronic Systems Center, Baltimore, Md.
MM&T-CERAMIC METAL SUBSTRATES FOR HYBRID ELECTRONICS: HANDBOOK
A. B. Timberlake and F. E. Merti Jan. 1984 69 p
(Grant DAAK21-80-G-0076)
(AD-A140689; HDL-CR-84-076-1) Avail: NTIS HC A04/MF A01 CSCL 19/1

The Handbook is a compilation of data and other relevant information obtained in the course of an 18-month program, details of which were presented in the final report published in August, 1983. The various known constructions of insulated metal (IM) substrates are described. The properties of porcelain-enameled steel (PES) substrates relevant to high-volume manufacture of thick-film hybrid microelectronic assemblies are presented. Typical properties of thick film conductors and resistors fired on PES substrates are described. Comparisons with alumina substrate materials are made. Wire bondability, solder back leach resistance, dependence of resistor properties on resistor geometry, and resistor stability data are presented. Thick-film and hybrid assembly experience with PES substrates are discussed. A bibliography citing numerous articles on PES, plasma-sprayed ceramic on metal, polymer thick film materials, and organic-metal laminates is included. Author (GRA)

N84-26791# Instituto Nacional de Tecnica Aeroespacial, Madrid (Spain).
COATING OF SELF-CATALYTIC NICKEL ON ALUMINUM AND ALUMINUM ALLOYS Final Scientific Report, 15 Jul. 1982 - 14 Sep. 1983
A. C. Alvarez-Quinones 14 Sep. 1983 26 p
(Grant AF-AFOSR-0316-82; AF Proj. 2301)
(AD-A140697; EOARD-TR-84-11) Avail: NTIS HC A03/MF A01 CSCL 11/6

INTA has developed a process for the coating of self-catalytic nickel on aluminum alloys. Program objectives: Formulation of the solutions capable of yielding self-catalytic nickel deposits on different metallic substrates. This requires in its turn; and selection

of the surfaces conditioning process according to the proper characteristics of the base metal. The metallic surfaces conditioning is in any case a factor of primary importance in order to insure a successful protection. In the case of the self-catalytic nickel depositions the said surfaces conditioning reaches its highest requirements being, probably the aluminum and its alloys, the metal which presents the major problems and to which, in our work program, it has been devoted a special attention. GRA

N84-26792# State Univ. of New York, Stony Brook. Dept. of Materials Science and Engineering.
ION IMPLANTATION METALLURGY: A STUDY OF THE COMPOSITION, STRUCTURE AND CORROSION BEHAVIOR OF SURFACE ALLOYS FORMED BY ION IMPLANTATION AND ION BEAM MIXING Final Report
C. R. Clayton and A. H. King Feb. 1984 16 p
(Contract N00014-77-C-0424)
(AD-A140713) Avail: NTIS HC A02/MF A01 CSCL 11/6

Diffusion induced grain boundary migration (DIGM) is necessarily a near surface phenomenon, as may be visualized by artificially separating the process into discreet steps. The first step, is the diffusion of a small amount of solute into a stationary grain boundary, Cb, above that in the adjacent matrix. Immediately following this step, the boundary moves sideways by some atomic shuffling cross the boundary plane. This deposits the solute from the boundary into the volume of matrix through which it sweeps. After this second step, the concentration of solute in the boundary is restored to its original level, and therefore, is the driving force for grain boundary diffusion, assuming that the source concentration remains constant, and that there is no effect of strain in the alloyed region. The process should then continue, if the boundary continues to move in the same direction and the depth and concentration of the allowed zone should both be related to the grain boundary diffusivity and the grain boundary mobility. Since the ability to control the depth and concentration of an alloyed zone is potentially useful for the purpose of tailing surface properties to service needs, a study of the exact relationships is desirable, however, much of the necessary information is not yet available, and complicated relationships may exist between grain boundary diffusivity and mobility. GRA

N84-26793# General Electric Co., Schenectady, N. Y.
SEM (SCANNING-ELECTRON-MICROSCOPY) STUDIES OF MAGNETIC DOMAINS IN AMORPHOUS METALS Annual Report, Dec. 1982 - Nov. 1983
J. D. Livingston Jan. 1984 15 p
(Contract N00014-82-C-0060)
(AD-A140718; Rept-84-SRD-019) Avail: NTIS HC A02/MF A01 CSCL 11/6

Magnetic domain structures in amorphous ribbons were characterized by SEM and Bitter technique. Studies include effects of anisotropy constant, applied currents, twisting, etc. Results are related to magnetic and magnetomechanical properties.
Author (GRA)

N84-26794# Brown Univ., Providence, R. I. Div. of Engineering.
INITIATION AND PROPAGATION OF SHEAR BANDS IN ANTIPLANE SHEAR DEFORMATION
F. H. Wu, M. Toulios, and L. B. Freund Mar. 1984 40 p
(Contract DAAG29-81-K-0121)
(AD-A140741; ARO-18414.4-EG; MRLE-151; TR-6; DAAG-012/6) Avail: NTIS HC A03/MF A01 CSCL 11/6

A large block of material is subjected to a constant average strain rate resulting in deformation in the antiplane shear mode. The material is assumed to be isotropic, incompressible and hyperelastic. To simulate the situation in which strain hardening of the material is overwhelmed by thermal softening, the shear stress as a function of shear strain has a local maximum. The block contains a material imperfection in the form of a small region in which the material is less stiff than the otherwise homogeneous block, and in which the maximum possible stress is less than in the surrounding material. The transient deformation is analyzed numerically by means of the finite element method. It is found that a shear band initiates in the region of the material defect, and then propagates in a crack-like fashion into the rest of the body. A prediction of the speed of propagation of the edge of the band is made on the basis of a linearization of the governing field equations around a state corresponding to the strain level at which the local maximum in stress occurs. Author (GRA)

N84-26795# State Univ. of New York, Stony Brook. Dept. of Materials Science and Engineering.
THERMALLY-SPRAYED ACTIVE METAL COATINGS FOR CORROSION PROTECTION IN MARINE ENVIRONMENTS M.S. Thesis - Final Report
E. S. Lieberman, C. R. Clayton, and H. Herman Jan. 1984 111 p
(Contracts N00406-82-C-2358; N61533-83-M-2596)
(AD-A140783; SUSB-84-1) Avail: NTIS HC A06/MF A01 CSCL 11/6

In this investigation, coatings of zinc, aluminum, zinc-15 wt% aluminum (ZA) and duplex-layered coatings of aluminum and zinc were flame and electric-arc sprayed onto mild steel substrates and exposed to a variety of corrosive conditions in a 3.0 wt% sodium chloride solution and in natural sea water. The goal of this study has been to obtain performance criteria and quality assessment of these coatings and to ultimately understand their mechanisms of protection as well as failure. The coating systems were subjected to electrochemical, salt spray, immersion and adhesion tests. To reduce surface porosity, thereby increasing the mechanical integrity and corrosion protection, the sprayed coatings were also sealed with an epoxy polyamide. The ZA coatings exhibit strong corrosion protection, high adhesive strength and a high coating density. A duplex-layered coating of aluminum, sprayed onto zinc-coated steel, proves to be effective in reducing crevice attack of the aluminum coating. Studies on the microstructure of electric-arc-sprayed coatings of different wire diameters revealed that as the wire diameter is decreased, a more dense coating will arise due to better atomization. GRA

N84-26796# Bundesanstalt fuer Materialpruefung, Berlin (West Germany).
MULTITECHNIQUE STUDIES ON FRETTING FATIGUE: INFLUENCE OF SURFACE TREATMENT Annual Report, Jan. - Dec. 1983
H. Sander Jan. 1984 13 p
(Contract DAJA45-83-C-0019)
(AD-A140812) Avail: NTIS HC A02/MF A01 CSCL 11/6

The problem of fretting fatigue is becoming more acute as increasing demands are placed on materials. As the conditions of contacting surfaces are of great influence for the fretting fatigue process, a project has been initiated to investigate the influence of mechanical surface treatments on the fretting fatigue behaviour of steel specimens. One of the initial steps taken has been the development of an experimental apparatus and a test technique that allows the fretting and fatigue process to occur simultaneously. The experimental program and the apparatus needed for investigating the effect of mechanical surface treatments on fretting fatigue is described. Author (GRA)

N84-26797# Rockwell International Science Center, Thousand Oaks, Calif.
PROCESSING AND PROPERTIES OF AIRFRAME MATERIALS Annual Report, 1 Jan. - 31 Dec. 1983
J. A. Wert, A. K. Ghosh, J. C. Chesnutt, and C. G. Rhodes Feb. 1984 51 p
(Contract F49620-83-C-0055; AF Proj. 2306)
(AD-A140832; SC5358.2AR; AFOSR-84-0250TR) Avail: NTIS HC A04/MF A01 CSCL 11/6

This annual report describes progress during the first year of the three year research program to study the relationship between microstructure and processing conditions, and the effect of processing conditions on the performance of structural airframe materials. Part 1 of this program is examining the influence of beta processing methods on the interaction of fatigue cracks with the microstructural elements. Three beta phase processing

methods have been chosen to provide variations in beta phase continuity and alpha phase plate size. The microstructure of the beta processed materials has been quantitatively characterized using SEM, TEM and STEM. Fatigue crack propagation results are also presented for each of the beta annealing treatments. In Part 2, the micromechanics of superplastic deformation behavior. Experiments have been performed with 7475 Al having various grain sizes. The flow stress vs strain rate behavior for the mixed grain size materials is best described using the iso-strain rate concept. Observations of dynamic grain growth and dynamic recrystallization have led to new perceptions of how these processes may alter the mechanical response of the materials during superplastic deformation. Based on these observations, the new model of the superplastic deformation process is outlined.
Author (GRA)

N84-26798# Institute TNO for Mechanical Constructions, Delft (Netherlands).
EXPERIMENTAL VERIFICATION OF CONSTITUTIVE EQUATIONS FOR PLASTICITY UNDER BIAXIAL, CYCLIC AND NONRADIAL LOADING CONDITIONS
G. T. M. Janssen (Technische Hogeschool, Twente, Netherlands) and J. Huetink Mar. 1983 13 p refs Presented at 6th SMIRT Conf., Paris, Oct. 1981 Sponsored by Nuclear Energy TNO
(Rept-5011202-81-1) Avail: NTIS HC A02/MF A01

The plasticity of austenitic steel WN 1.4948 and ferritic steel WN 1.6770 at room temperature was studied to obtain constitutive equations for plastic deformations arising from arbitrary loading histories. Plastic deformation is described by the fraction model. Since austenitic steel shows considerable strain rate effects at room temperature it was necessary to extend the description with viscoplasticity. The mathematical description was verified for biaxial states of stress. Loading programs with monotonically increasing loading conditions, as well as cyclic and nonradial loading histories were considered. The ratio between experimental results and theoretical predictions is satisfactory. Author (ESA)

N84-26799# Institute TNO for Mechanical Constructions, Delft (Netherlands).
PREDICTION OF DUCTILE CRACK GROWTH IN THE AUSTENITIC STEEL WN 1.4948 AT AMBIENT AND ELEVATED TEMPERATURE
G. T. M. Janssen, J. vanderEikhoff, and H. J. M. VanRongen (Metal Research Institute TNO) Mar. 1983 11 p refs Presented at 6th SMIRT Conf., Paris, Aug. 1981 Sponsored by Nuclear Energy TNO
(Rept-5011202-81-2) Avail: NTIS HC A02/MF A01

The relationship between the plastic and/or creep deformation history near the crack tip and the crack growth of fast breeder reactor materials was studied. Results concerning crack blunting and initiation of steady crack growth at room temperature in austenitic steel are presented. The experimental procedure to determine the initiation point with the blunting line and J-delta a curve concept is discussed. The transferability of fracture mechanics parameters at onset of steady crack growth was examined. Elastic-plastic finite element calculations were carried out on a compact tension and a center cracked specimen. The inelastic deformations were described by fraction models. For both specimens two crack lengths were examined. The size of crack length variation is of the order of magnitude of the crack extension due to blunting. Author (ESA)

N84-26800# Institute TNO for Mechanical Constructions, Delft (Netherlands).
EXPERIMENTAL VERIFICATION OF CONSTITUTIVE EQUATIONS FOR CREEP AND THE INTERACTION OF CREEP AND PLASTICITY UNDER BIAXIAL LOADING CONDITIONS
F. Roode and W. Dortland (Metal Research Institute TNO) Mar. 1983 12 p refs Presented at 6th SMIRT Conf., Paris, Aug. 1981 Sponsored by Nuclear Energy TNO
(Rept-5011202-81-3) Avail: NTIS HC A02/MF A01

Creep experiments were carried out on austenitic steel WN 1.4948 to produce constitutive equations for creep deformations arising from arbitrary conditions. Constant load and program loading creep tests on solid specimens, including relaxation and recovery as well as stepwise increasing and decreasing loads, were performed. Tubes were subject to combinations of an axial load, torsional load and internal pressure. The constitutive equations were based on the fraction model, in which a volume element is subdivided into a set of parallel volume fractions. Each volume fraction exhibits a purely isotropic material behavior and can describe elastic behavior and primary and secondary (nonrecoverable) creep deformations. The combination of the parallel volume fractions introduces a kinematic hardening (recoverable) creep deformation. The fraction model shows acceptable agreement with experimental results for various types of biaxial loading conditions. Author (ESA)

N84-26720# Battelle Inst., Frankfurt am Main (West Germany).
ON THE SEPARATION OF ALLOYS EXHIBITING A MISCIBILITY GAP
D. Langbein *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 3-12 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

N84-26721# Max-Planck-Institut fuer Metallforschung, Stuttgart (West Germany).
THERMODYNAMICS OF THE DECOMPOSITION OF LIQUID ALLOYS
R. Lueck and B. Predel *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 13-23 refs Prepared in cooperation with Stuttgart Univ. (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

N84-26722# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Casting of Metals.
SPACE RESULTS ON THE SOLIDIFICATION OF IMMISCIBLE ALLOYS
H. Fredriksson *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 25-34 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

N84-26724# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Space Simulation.
FIRST RESULTS OF A MAUS EXPERIMENT TO INVESTIGATE THE STABILITY OF A METALLIC DISPERSION
G. H. Otto *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 43-46 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

N84-26725# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Warkstoff-Forschung.
PREPARATION OF DISPERSION ALLOYS: COMPONENT SEPARATION DURING COOLING AND SOLIDIFICATION OF DISPERSIONS OF IMMISCIBLE ALLOYS
H. U. Walter *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 47-64 refs Sponsored by ESA and Bundesministerium fuer Forschung und Technologie (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

N84-26726# Katholieke Universiteit te Leuven (Belgium). Dept. Metaalkunde.
MELTING AND SOLIDIFICATION OF METALLIC COMPOSITES
A. Deruyterre and L. Froyen *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 65-67 ref (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

N84-26727# Max-Planck-Institut fuer Metallforschung, Stuttgart (West Germany). Inst. fuer Werkstoffwissenschaften.
OSTWALD RIPENING, INTERFACIAL ENERGIES AND DIFFUSION COEFFICIENTS IN MONOTECTIC SYSTEMS
H. F. Fischmeister and H. E. Exner *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 69-70 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

N84-26729# Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
FILTRATION THEORY APPROACH TO IMMISCIBLE ALLOYS SOLIDIFICATION
C. Potard *In* ESA The Effect of Gravity on the Solidification of Immiscible Alloys Mar. 1984 p 79-82 refs (For primary document see N84-26719 17-12)
Avail: NTIS HC A05/MF A01

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N84-26801 United Kingdom Atomic Energy Authority, Risley (England).
POLYMERS WHICH ARE RESISTANT TO IONIZING RADIATION FOR PAINTS USED IN LIGHT WATER NUCLEAR POWER STATIONS
Antonio Cabrini and Giorgio Repetti 27 Feb. 1984 17 p refs Transl. into ENGLISH from Pitture e Vernici (Italy), v. 10, Oct. 1983 p 98-104
(BLL-Risley-TR-4907-(9021.9F)) Copyright. Avail: British Library Lending Div., Boston Spa, England

Among the characteristics of the polymers used for coatings in light water reactors (LWR) nuclear power plants, radiation resistance and decontaminability are the most significant. Radiation levels and other environmental conditions such as temperature and pressure typical of light water nuclear power stations boiling water reactors (BWR) and pressurized water reactors (PWR), including loss of primary coolant (LOCA) and fire conditions, are briefly reviewed to define test conditions for point products. Some theoretical interpretations of radiation damage to organic materials are reported, including a method for the evaluation of polymeric materials. The radiation resistance of different polymers (obtained from the technical literature or by experimental work) is shown.
R.S.F.

N84-26802# Materials Research Labs., Ascot Vale (Australia). Organic Chemistry Div.
DEFORMATION AND FRACTURE STUDIES OF POLYMERS IN THE SCANNING ELECTRON MICROSCOPE
S. Bandyopadhyay [1983] 13 p refs Presented at a Symp. on Deformation, Failure and Strengthening of Polymers, Clayton, Australia, 23-25 May 1984
Avail: NTIS HC A02/MF A01

Good depth of field, combined with high resolution, a large working chamber and less rigorous needs for specimen preparation make scanning electron microscopes attractive for in-situ observation of the microscopic aspects of deformation and fracture of engineering materials. The adaptation of this technique to examine polymeric materials is reviewed and illustrated by a brief account of current research at the Materials Research Laboratories which demonstrates the novel nature of information that can be obtained.
Author

N84-26803*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SPUTTERED COATINGS FOR PROTECTION OF SPACECRAFT POLYMERS
Bruce A. Banks, Michael J. Mirtich, Sharon K. Rutledge, and Diane M. Swec [1983] 13 p refs Presented at the 11th Intern. Conf. on Met. Coatings, San Diego, Calif., 9-13 Apr. 1984; sponsored by Am. Vacuum Soc.
(NASA-TM-83706; E-2092; NAS 1.15:83706) Avail: NTIS HC A02/MF A01 CSCL 11B

Kapton polyimide oxidizes at significant rates (4.3x10(-24) gram/incident oxygen atom) when exposed in low Earth orbit to the ram atomic oxygen flux. Ion beam sputter deposited thin films of Al2O3 and SiO2 as well as a codeposited mixture of predominantly SiO2 with a small amount of polytetrafluoroethylene were evaluated and found to be effective in protecting Kapton from oxidation in both laboratory plasma ashing tests as well as in space on board shuttle flight STS-8. A protective film of > or = 96 percent SiO2 and < or = 4 percent polytetrafluoroethylene was found to be very flexible compared to the pure metal oxide coatings and resulted in mass loss rates that were 0.2 percent of that of the unprotected Kapton. The optical properties of Kapton for wavelengths investigated between 0.33 and 2.2 microns were not significantly altered by the presence of the coatings or changed by exposure of the coated Kapton to the low Earth orbital ram environment.
M.G.

N84-26804# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SYNTHESIS OF POLYHETEROARYLENES FOR HIGHLY HEAT-RESISTANT MATERIALS
A. Y. Chernikhov, L. A. Rodivilova, Y. I. Krayevskaya, L. I. Golubenkova, and B. M. Kovarskaya 4 Apr. 1984 11 p Transl. into ENGLISH from Plasticheskiye Massy (USSR), no. 4, Apr. 1973 p 24-27
(AD-A140610; FTD-ID(RS)T-0351-84) Avail: NTIS HC A02/MF A01 CSCL 11/9

The advantages and disadvantages of using single- and two-stage polycondensation techniques to obtain heat resistant polyheteroarylenes are examined. Phosphoric acid was used as the medium and the condensing agent in a study of processes for obtaining poly 1,3,4-ohxadiozoles and polybezoxazoles. One product obtained was used as a binder for laminated plastics. The other was used to bind fiber glass plastic structures which remained stable for long periods at 300 C. The prospect of creating polymers based on monomers containing nitrile groups is discussed.
A.R.H.

N84-26805# Technion Research and Development Foundation Ltd., Haifa (Israel).
DURABILITY OF STRUCTURAL ADHESIVELY BONDED SYSTEMS
O. Ishai, G. Yaniv, and E. Altus Nov. 1983 126 p
(Contract DAJA37-80-C-0303; DA Proj. 1T1-61102-BH-57)
(AD-A140714) Avail: NTIS HC A07/MF A01 CSCL 11/1

The present report deals with the mechanical behavior of the bonded system after curing and in service when exposed to different hygrothermal conditions. An analysis was developed which enable the prediction of adhesive residual thermal stresses after curing, their time dependence on temperature and moisture conditions, and the resulting deformational behavior of the bonded system. The nonlinear viscoelastic behavior of the adhesive under such circumstances was tackled by using advanced finite element approach. The deformational behavior of a nonsymetrical bonded specimens were examined through experimental investigation. Analytical results indicate a significant Hygrothermal effects on stress relaxation in the adhesive at the viscoplastic range. A mathematical tool was developed to deal with the effect of stresses on interlaminer crack propagation. This will, provide the first step toward the prediction of failure initiation and propagation within the bonded phases, which is the objective of the next stage of the present project.
GRA

N84-26806# Rutgers - The State Univ., Piscataway, N. J. Dept. of Mechanics and Materials Science.
THE EFFECT OF PLASTICIZER ON THE POLARIZER OF POLY(VINYLIDENE FLUORIDE) FILMS
A. Sen, J. L. Scheinbeim, and B. A. Newman 12 Apr. 1984 33 p

(Contract N00014-80-C-0795)
(AD-A140770; TR-3) Avail: NTIS HC A03/MF A01

Plasticized and unplasticized, unoriented phase 2 PVF2 films were poled at fields ranging from 0.5 MV/cm to 1.25 MV/cm at room temperature for 10 minutes. X-ray diffraction data revealed that at fields near 1.0 MV/cm, a change in conformation to produce phase 1 occurred. The amount of Phase 1 produced was found to be significantly higher in the case of plasticized film. The plasticized films also showed higher piezoelectric strain coefficient, d sub 31, stress coefficient, e sub 31, and pyroelectric coefficient P sub y as compared to unplasticized films subjected to identical poling conditions. In a similar study of oriented phase 1 films (obtained by stretching plasticized and unplasticized phase II films), poling fields ranging from 0.5 MV/cm to 2.0 MV/cm were used. The Bragg angle for the (110), (200) reflection and the half-width for this reflection were found to be higher for the poled plasticized films with 2 theta increasing with increasing plasticizer content. P sub y, e sub 31, and d sub 31 were also higher as compared to the plasticized films. Author

N84-26807# General Electric Co., Schenectady, N. Y.
DEVELOPMENT OF SINTERED Si3N4 FOR HIGH PERFORMANCE THERMOMECHANICAL APPLICATIONS Final Report, 30 Aug. 1982 - 30 Aug. 1983
W. D. Pasco DOE Jan. 1984 66 p
(Contract DAAG46-82-C-0053)
(AD-A140795; Doc-84SRD026; AMMRC-TR-84-4) Avail: NTIS HC A04/MF A01 CSCL 13/8

The sintering of Si3N4 containing BeSiN2 and YO3 was examined and found to yield densities greater than 99% on a routine basis. A composition containing 2.5 wt% BeSiN2 and 3.0 Y2O3 displayed a room temperature strength of greater than 690 MPa and a fracture toughness Kic of about 6 MNm--3/2 power, a creep rate of .00004/h at 1300 C under a 69 MPa load, and a parabolic rate constant for oxidation at 1350 1.7 x 10 to the -11 power sq. kg/m to the -4 power/s. This composition has adequate properties for high temperature structural applications except for the high creep rate, which is of the same order as Nc-132. The sintering of Si3N4 containing 5 wt% LiAl5O8 and 3 wt% YF3 was examined and found to yield densities of greater than 96%. The creep rate of this composition was 5 x .005/h at 1300 C under a 69 MPa load. The high creep rate, in conjunction with a moderately high oxidation rate, precludes the use of this composition for high temperature structural applications. A new source of Si3N4 powder, made by Ube Industries, was qualified as an alternative powder source of this program. The addition of 7 wt% BeSiN2 in conjunction with a total oxygen content of 3.5 wt% yielded sintered densities of greater than 98.5%. GRA

N84-26808# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CHEMICAL NEWS (SELECTED ARTICLES)
Z. Urbanski and M. Chmielewski 13 Apr. 1984 10 p Transl. into ENGLISH from Wiadomosci Chem. (Poland), v. 29, no. 12, Dec. 1975 p 855-858
(AD-A140887; FTD-ID(RS)T-0348-84) Avail: NTIS HC A02/MF A01 CSCL 07/3

Brief descriptions of the topics presented during scientific conferences on thermal stable polymers and stereochemistry of thermally stable polymers was discussed along with chemical properties and molecular structures. Stereochemistry vis-a-vis phosphorus, simple sugars, amides, heterocyclic compounds, and ethers was addressed. R.S.F.

N84-26809# Queen Mary Coll., London (England). Dept. of Materials.
DEVELOPMENT OF HIGH MODULUS POLYDIACETYLENE FIBRES FOR USE IN FIBRE-REINFORCED COMPOSITES Final Technical Report
R. J. Young, C. Galiotis, and P. H. J. Yeung Feb. 1984 67 p
(Contract DAJA37-81-C-0501; DA Proj. 1T1-61102-BH-57)
(AD-A140912) Avail: NTIS HC A04/MF A01 CSCL 11/9

The relationship between structure and mechanical properties in polydiacetylene single crystal fibers has been studied in detail. It has been shown by transmission electron microscopy that the fibers have a high degree of internal perfection with the polymer molecules aligned parallel to the fiber axes. The fibres of the di-carbazolyl derivative investigated were found to have a Young's modulus of 45 GPa and fracture strengths of up to 1.5 GPa, the strength being controlled by defects such as surface steps. It was shown that the stiffness of the polymer backbone is similar to that of polyethylene and the theoretical strength of the polydiacetylene single crystal fibers has been determined to be about 3 GPa, corresponding to a fracture strain of between 6% and 8% and a force required to break molecules of the order of 3nN. A model composite system consisting of one polydiacetylene single crystal fiber in an epoxy resin matrix has been subjected to tensile strain parallel to the fiber direction. The resonance Raman strain measurement technique has been extended to measure the distribution of fiber strain in composites containing bundles of polydiacetylenes in both an epoxy matrix and a glass-fiber/epoxy/ composite. The deformation of epoxy composites containing high volume fractions of polydiacetylene single crystal fibers has been investigated both tension and compression. GRA

N84-26810# Daedalean Associates, Inc., Woodbine, Md.
TECHNICAL REPORT ON SPRAYABLE COMPLIANT COATINGS Final Report, 31 Aug. 1982 - 30 Jun. 1984
J. R. Yokley and R. S. Weinreich Feb. 1984 43 p
(Contract MA-7-38048)
(PB84-178011; JRY-7773C-001-TR; MA-RD-760-84018) Avail: NTIS HC A03/MF A01 CSCL 11C

Differences between protective and compliant polyurethane coatings are examined. The types of inclusions in compliant coatings are listed. Attempts to establish whether suitable void contents can be incorporated for spray applied systems are reported. Topics cover: varying the density of urethane materials; spray techniques, principles, and equipment; and preparing sprayed urethane samples. A.R.H.

N84-26811# Illinois Inst. of Tech., Chicago.
SURFACE EMBRITTLEMENT OF POLYETHYLENE PIPE GRADE RESINS Annual Report, 1 Sep. 1982 - 31 Aug. 1983
Lawrence J. Broutman Jan. 1984 85 p refs Sponsored by Gas Research Inst.
(PB84-181973; GRI-83/0070) Avail: NTIS HC A05/MF A01 CSCL 11I

A specimen was developed which simulates the behavior and failure modes of polyethylene pipe subjected to sustained internal pressure. The specimen is uniaxially tensile loaded, but surface grooves constrain deformation producing a plane strain state in the grooved area which results in a stress state simulating that of internally pressurized pipe. When this specimen is subjected to a constant tensile load as in a creep-rupture test, a ductile-brittle transition occurs agreeing closely with transition times measured for pressurized pipe. The microscopic nature of the failure process during test can be visually observed. The specimen lends itself to controlled and uniform surface embrittlement (e.g., by ultra violet radiation), so that its influence on lifetime can be easily determined. Results to data show that for a medium density pipe grade resin, the ductile-brittle transition time can be reduced by a factor of at least three. GRA

N84-26600# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
NEW AIRCRAFT WINDSHIELD APPLICATIONS USING ION EXCHANGE GLASS
W. W. Hornsey and W. F. Rothe *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 57-70
(For primary document see N84-26596 17-01)
(AD-P003187) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26605# Texstar Corp., Grand Prairie, Tex.
TESTING POLYCARBONATE FOR UTILIZATION IN THE PRODUCTION OF TRANSPARENT ENCLOSURES
A. J. Bonje and J. Irion *In* Dayton Univ. Conf. on Aerospace

Transparent Mater. and Enclosures Dec. 1983 p 174-182 (For primary document see N84-26596 17-01)
(AD-P003192) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26606# National Research Council of Canada, Ottawa (Ontario).
DEGRADATION OF THE BIRD IMPACT RESISTANCE OF POLYCARBONATE
J. B. R. Heath and R. W. Gould *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 183-211 (For primary document see N84-26596 17-01)
(AD-P003193) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26607# Dayton Univ., Ohio.
THE EFFECT OF ACCELERATED ULTRA VIOLET WEATHERING ON THE RAIN EROSION RESISTANCE OF COATED AIRCRAFT TRANSPARENCIES
C. J. Hurley and G. F. Schmitt *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 213-236 (For primary document see N84-26596 17-01)
(AD-P003194) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26609# British Airways, Middlesex (England).
SOME CRAZING EXPERIMENTS ON AS-CAST ACRYLIC TO MIL-P-8184
K. B. Armstrong *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 260-274 (For primary document see N84-26596 17-01)
(AD-P003196) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26614# Naval Research Lab., Washington, D. C.
FLUROEPOXY AND FLUROACRYLIC TRANSPARENCIES
J. R. Griffith *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 407-414 (For primary document see N84-26596 17-01)
(AD-P003201) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26615# Coors Porcelain Co., Golden, Colo.
POLYCRYSTALLINE MgAl2O4 SPINEL FOR HIGH PERFORMANCE WINDOWS
D. W. Roy and J. L. Hastert *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 415-426 (For primary document see N84-26596 17-01)
(AD-P003202) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26616# Swedlow, Inc., Garden Grove, Calif.
AN IMPROVED ACRYLIC SHEET MATERIAL WITH ENHANCED CRAZE RESISTANCE
M. V. Moncur and W. F. Fisher *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 428-450 (For primary document see N84-26596 17-01)
(AD-P003203) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26617# PPG Industries, Inc., Pittsburgh, Pa. Glass Research Center.
PROTECTIVE LINEAR MATERIALS FOR TRANSPARENT PLASTICS
J. E. Mahaffey and T. G. Rukavina *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 451-467 (For primary document see N84-26596 17-01)
(AD-P003204) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26618# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
HEAT RESISTANT COPOLYESTER-CARBONATE TRANSPARENT PLASTICS
T. J. Reinhart *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 468-495 (For primary document see N84-26596 17-01)
(AD-P003205) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26619# Swedlow, Inc., Garden Grove, Calif.
SPECIALTY COATINGS FOR INCREASED SERVICE LIFE OF ACRYLIC AIRCRAFT TRANSPARENCIES, PART 2
W. C. Harbison *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 496-525 (For primary document see N84-26596 17-01)
(AD-P003206) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26623# Ministry of Defence, London (England).
ARTIFICIAL AGING OF TRANSPARENT AEROSPACE MATERIALS
A. Davis *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 582-596 (For primary document see N84-26596 17-01)
(AD-P003210) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26640# Royal Aircraft Establishment, Farnborough (England).
THE WIPER ABRASION AND RAIN EROSION RESISTANCE OF TRANSPARENT MATERIALS AND COATINGS FOR AIRCRAFT GLAZING
N. S. Corney and R. J. King *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 892-909 (For primary document see N84-26596 17-01)
(AD-P003227) Avail: NTIS HC A08/MF A01 CSCL 01/3

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N84-26812# Materials Research Labs., Melbourne (Australia). Physical Chemistry Div.
DETONATION PARAMETERS FOR AUSTRALIAN HIGH-EXPLOSIVES COMPOSITION
G. J. Jenks, J. J. Masinskas, and D. A. Price (Melbourne Univ., Australia) [1983] 26 p refs Document includes a microfiche supplement
(MRL-R-822; AR-003-292) Avail: NTIS HC E04/MF A01

The implementation of the BKW computer code on the CSIRO Cyber 76 computer network is described. A user interface is developed so that difficulties in transferring the program to another computer are minimized and so that results are obtained reliably and quickly from data already stored in the network. Author

N84-26813*# Pennsylvania State Univ., University Park.
UTILIZATION OF ALTERNATIVE FUELS IN DIESEL ENGINES Final Report
Samuel A. Lestz May 1984 74 p refs
(Grant NAG3-91; Contract DE-AI01-81CS-50006)
(NASA-CR-174669; DOE/NASA/0091-1; NAS 1.26:174669; CAES-700-84) Avail: NTIS HC A04/MF A01 CSCL 21D

Performance and emission data are collected for various candidate alternate fuels and compare these data to that for a certified petroleum based number two Diesel fuel oil. Results for methanol, ethanol, four vegetable oils, two shale derived oils, and two coal derived oils are reported. Alcohol fumigation does not appear to be a practical method for utilizing low combustion quality fuels in a Diesel engine. Alcohol fumigation enhances the bioactivity of the emitted exhaust particles. While it is possible to inject many synthetic fuels using the engine stock injection system, wholly acceptable performance is only obtained from a fuel whose specifications closely approach those of a finished petroleum based Diesel oil. This is illustrated by the contrast between the poor performance of the unupgraded coal derived fuel blends and the very good performance of the fully refined shale derived fuel. M.A.C.

N84-26814# SRI International Corp., Menlo Park, Calif.
LASER PROBES OF PROPELLANT COMBUSTION CHEMISTRY Final Report, 30 Sep. 1980 - 31 Jan. 1984
D. R. Crosley, G. P. Smith, and D. M. Golden 29 Mar. 1984 201 p

(Contract DAAG29-80-K-0049)
(AD-A140767; SRI-MP-84-053; ARO-17416.9-CH) Avail: NTIS HC A10/MF A01 CSCL 07/4

Laser-induced fluorescence (LIF) can be used to measure the atomic, diatomic, and triatomic free radicals that are the intermediates in combustion chemistry. Coupled with detailed models, which incorporate a sound and consistent set of reaction rate constants, such measurements can lead to an understanding of that chemistry, having predictive value for use under experimentally difficult conditions. This report describes the development of LIF techniques, the applications of such techniques of flames and to laser pyrolysis/laser fluorescence kinetics experiments, studies of rate constant estimations and detailed modeling of combustion chemistry. The chemistry studied is that of combusting mixtures of CH4/N2O, CH2O/N2O, CH2O/NO2, and related compounds. These contain the chemical networks, individual reactions, and radical species present in the gas-phase combustion of nitramine propellants, such as HMX and RDX. The tasks described are LIF diagnostic studies on O, N, OH, NCO, and NH2 in flow systems and flames, rate constant estimation studies for unimolecular decomposition of CH2O and several hydrocarbons, modelling of the CH2O/N2O flame, and laser pyrolysis/laser fluorescence studies of CH4/N2O and CH2O/N2O chemistry. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N84-26815 Institute TNO for Mechanical Constructions, Delft (Netherlands).
MULTIDIRECTIONAL FORCE AND MOMENT TRANSDUCER
Mar. 1983 34 p refs Presented at 4th SESA Intern. Congr. on Exptl. Mech., Boston, 1980
(Rept-5211901-80-1) Copyright. Avail: Issuing Activity

A multidirectional strain gage based measuring element is described. A self-recording underwater tension transducer with pressure compensation is presented. An instrumented riser joint to measure stresses, mud pressure and mud temperatures at 500 m water depth is introduced. For individual titles, see N84-26816 through N84-26818.

N84-26816 Institute TNO for Mechanical Constructions, Delft (Netherlands).
MULTIDIRECTIONAL FORCE AND MOMENT TRANSDUCER c35
J. P. Mast and H. Wieringa *In its* Multidirectional Force and Moment Transducer Mar. 1983 p 1-12 refs (For primary document see N84-26815 17-31)
Copyright. Avail: Issuing Activity

A multidirectional strain gage based measuring element for constructions loaded in the six possible ways is described. It measures strains caused by shearing stresses in the columns of a slotted cylinder. It has good repeatability especially for the axial force and bending in each plane through the axis of symmetry of the transducer. Interaction between the several outputs is small and can be easily corrected. The transducer is simple to design and to manufacture. The tolerances are relatively high. Its height is low compared to its diameter. A disadvantage is the greater than normal softness of the transducer, however, this can be compensated by increasing the number of slots and the number of torque gages. Applications to a snow plow, wind generator, Octoplus, and instrumented riser joint for offshore platforms are mentioned. Author (ESA)

N84-26817 Institute TNO for Mechanical Constructions, Delft (Netherlands).
PRESSURE COMPENSATED FORCE TRANSDUCER c35
D. deHaan (Netherlands Institute for Fishery Investigation) and J. P. Mast *In its* Multidirectional Force and Moment Transducer Mar. 1983 p 13-24 refs (For primary document see N84-26815 17-31)
Copyright. Avail: Issuing Activity

A self-recording, underwater tension transducer with pressure compensation is described. The transducer was designed for monitoring tensile forces in the warps and bridles of pelagic nets. Data are stored in a semiconductor memory during the logging operation. After 9 hr the transducer has to be opened to read out the memory. System battery capacity is at least 1 day measurement. Measuring range is 75 kN to within 0.5%, for water depths down to 500 m. Author (ESA)

N84-26818 Koninklijke/Shell-Laboratorium, Amsterdam (Netherlands).
DEVELOPMENT OF AN INSTRUMENTED RISER JOINT c35
A. H. vanderKrogt and N. J. vanSoldt *In* Inst. TNO for Mech. Construct. Multidirectional Force and Moment Transducer Mar. 1983 p 25-32 refs Presented at 10th Ann. Offshore Technol. Conf., Houston, 8-11 May 1978 (For primary document see N84-26815 17-31)
Copyright. Avail: Issuing Activity

An instrumented riser joint (IRJ) to continuously record stresses, mud pressures, and mud temperatures was designed for a 24-in. riser operating 500 m water depth, and was installed on a drilling vessel in the North Sea. The IRJ measures axial force (Fz) and bending moments (Mx and My). Design specifications are F = 2.75 MN and Mx and My = 350 kn m, the inaccuracy is 1 %. Field tests and correlation of IRJ output with environmental and vessel motion data show that the IRJ gives reliable output, although due to the laminar flow of the mud in the riser, the temperature indicator does not measure the average mud temperature.
Author (ESA)

N84-26819# Naval Ocean Systems Center, San Diego, Calif. Office of Research and Technology Applications.
CURV 3: CHARACTERISTICS AND MISSION APPLICATIONS Final Report
W. W. Perkins and L. K. Brady Mar. 1984 10 p
(AD-A140225; NOC-TD-651) Avail: NTIS HC A02/MF A01 CSCL 13/10

The Cable-Controlled Underwater Recovery Vehicle (CURV) program was begun by NOSC for the specific purpose of developing economical systems to recover test ordnance at NOSC's Long Beach and San Clemente Island test ranges. CURV 3 is the latest in this series of tethered, unmanned, remotely controlled vehicles and its present capabilities far exceed the original CURV 1. Originally conceived for use as a search and recovery vehicle, CURV has evolved into a versatile and easily adaptable multipurpose work vehicle capable of performing search and recovery tasks as well as pursuing test, evaluation, exploration, and work projects. Basically, CURV is a composite of integrated subsystems including such items as propulsion, search and navigation, optics, hydraulics, and tools. Because it is unmanned and does not require life support or other complex support systems, CURV is able to perform most undersea tasks more economically and efficiently than maned systems. Also, since it is powered and controlled from the surface, CURV has a continuous, unlimited operating capability. Under emergency conditions, the vehicle can operate to 10,000-foot depths. CURV can be easily transported to any spot in the world. Upon arrival of the vehicle, control van, cable, and support gear can be mounted on a suitable ship of opportunity. M.G.

N84-26820# Naval Facilities Engineering Command, Alexandria, Va.
ARCHITECTURE EARTH-SHELTERED BUILDINGS: DESIGN MANUAL 1.4
Mar. 1984 252 p
(AD-A140831; NAVFAC-DM-1.4) Avail: NTIS HC A12/MF A01 CSCL 13/2

Design guidance is presented for use by experienced engineers and architects. The types of buildings within the scope of this manual include slab-on-grade, partially-buried (bermed) or fully-buried, and large (single-story or multistory) structures. New criteria

unique to earth-sheltered design are included for the following disciplines: Planning, Landscape Design, Life-Cycle Analysis, Architectural, Structural, Mechanical (criteria include below-grade heat flux calculation procedures), and Electrical. GRA

N84-26821# Joint Publications Research Service, Arlington, Va.
USSR REPORT: ELECTRONICS AND ELECTRICAL ENGINEERING
29 May 1984 57 p Transl. into ENGLISH from various Russian articles
(JPRS-UEE-84-007) Avail: NTIS HC A04/MF A01

This serial report contains news items, abstracts and articles of scientific reports on aspects of electronics and electrical engineering including acoustic speech; signal processing; aerospace; antennas and propagation; broadcasting; consumer electronics; circuits and systems; communications; computers; electronic devices; instruments and measurements; microwaves; power engineering; and sonics and ultrasonics. For individual titles, see N84-26822 through N84-26883.

N84-26822# Joint Publications Research Service, Arlington, Va.
ALGORITHMS OF ADAPTIVE MARKOV FILTRATION OF NOISY SPEECH SIGNALS Abstract Only **c32**
M. V. Nazarov, Yu. N. Prokhorov, and V. I. Kovyazin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-0070 29 May 1984 p 1 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 10-15 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A complete Markov model of a noisy speech signal is formed by the conventional autoregression equation describing uncorrelated random processes in the voice channel and the simplest nonlinear autoregression equation describing a periodic signal from the voice source. This system of two equations is subsequently rewritten in vector form and, on this basis, the algorithm of Markov filtration is formulated following the method of invariant submersion with maximum a posteriori probability as criterion. The five consecutive steps of such an algorithm are one step prediction, calculation of filter gain, filtration, evaluation of the a priori error-covariance matrix and evaluation of the a posteriori error-covariance matrix. The corresponding equations are solved sequentially for given initial conditions, the number of equations depending on the dimensionality of the model and the simplifying assumptions. Calculations are shown for the case of symmetric error covariance matrices, with the autoregression coefficients described by difference equations of first and second orders.
Author

N84-26823# Joint Publications Research Service, Arlington, Va.
STRUCTURAL FUNCTION OF LUNAR RELIEF ACCORDING TO RADAR DATA Abstract Only **c91**
I. M. Fuks *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 2 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1194-1204 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Extensive radar studies of the Moon were made in the nineteen sixties and seventies, using wavelengths from 8.6 mm to 19 m, and the data were useful for high resolution lunar surface cartography. A composite two scale model was proposed for interpretation of the data, specifically the dependence of the scattering cross section on the wavelength and the incidence angle. The lunar relief is described statistically relative to the radius vector of a point on an ideal smooth spherical surface. The diffraction problem for radio waves at the Moon is solved on the basis of this model. With normal deviations of the real surface from the ideal one assumed to have a fairly small dispersion, according to the Rayleigh criterion, this problem for the fine structure is solved by the perturbation method. The directional pattern of scattering reveals at least two regions, each corresponding to a different scattering mechanism. Author

N84-26824# Joint Publications Research Service, Arlington, Va.
LOSS FUNCTION USED IN OPTIMIZATION OF ARRAY OF COUPLED TRACKING RADIOELECTRONIC SYSTEMS Abstract Only **c32**
V. B. Vagapov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 3 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 26-28 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A loss function is defined as a criterion for optimization of coupled multidimensional tracking systems, in preference to the two conventional complementary loss functions relative to the maximum tracking accuracy and the permissible range of tracking error respectively. The penalty of error is calculated accordingly by solution of the corresponding equation of motion for the tracking system, specifically a second-order (velocity-acceleration) tracking system in which the discriminator output signal is an additive mixture of tracking error and interference. First, such a one dimensional tracking system is considered and next, a two dimensional system consisting of two such one dimensional ones coupled through the error of their identical respective tracking loops. The mathematical expectation of this loss function was calculated as a function of the slope of the discriminator characteristic, the curves for $n = 2,4,8$ were normalized to minimum values of the corresponding loss function. Author

N84-26825# Joint Publications Research Service, Arlington, Va.
OPTIMIZATION OF TWO-COORDINATE SURFACE RADAR STATION BY COMBINATION OF TECHNICAL AND ECONOMIC INDICES Abstract Only **c32**
N. S. Gubonin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 3 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 33-34 Original language document was announced as A84-25439 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The problem of vector optimization according to an unconditional preference criterion is solved for a circular-scan two-coordinate ground radar. An explicit expression is obtained for a multidimensional exchange diagram (describing the set of nonworse systems or the Pareto set) of technicoeconomic indices, including cost, measervice life, miss and false-alarm probabilities, range, range resolution, and the maximum number of simultaneously tracked targets. Formulas are obtained for the optimization of the radar system at the early stages of design, and it is noted that the multidimensional exchange diagram can be used in interacting-radar optimization models to validate requirements imposed on the quality indices of an individual radar. B.J. (IAA)

N84-26826# Joint Publications Research Service, Arlington, Va.
SYNTHESIS OF DEVICES FOR OPTIMUM PROCESSING OF SIGNALS IN LOW-ALTITUDE RADIO ALTIMETER Abstract Only **c32**
Yu. N. Moiseyenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEW-84-007) 29 May 1984 p 4 Transl. into ENGLISH from Radiotehn. (Moscow), no. 1, Jan. 1984 p 50-53 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A way of increasing the precision and noise immunity of measurers of the flight altitude of flying vehicles by the use of algorithms for processing signals, synthesized on the basis of the Markov theory of optimum nonlinear filtration is considered. Author

N84-26827# Joint Publications Research Service, Arlington, Va.
STABLE HETERODYNING SYSTEM IN RT-22 RADIO TELESCOPE FOR MILLIMETRIC-WAVE SPECTROSCOPY Abstract Only **c33**
V. A. Gusev and R. L. Sorochenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 5 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1205-1209 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A heterodyning system was developed for a RT-22 radio telescope. The principal components are a Ch6-31 frequency synthesizer acting as local oscillator with frequency tuning, its frequency instability not exceeding .003 over a period of 0.2 s, followed by a phase filter. The latter consists of a low noise (-94 dB/kHz) tunable (22.5 to 24 MHz) oscillator built with a field effect transistor, a phase detector, a d.c. amplifier, and a low pass filter. The system is provided with automatic phase lock frequency control (35 to 37 GHz) and automatic frequency lock frequency control (22 to 23 GHz), each through an appropriate feedback loop, operating each alone or both together. In the latter case the outputs from the phase detector and the frequency detector are added with weight factors in the d.c. amplifier. Author

N84-26828# Joint Publications Research Service, Arlington, Va.
COLLECTIVE MODE OF EVOLUTION OF PLASMA PRODUCED BY OPTICAL BREAKDOWN IN AEROSOL MEDIUM Abstract Only **c75**
V. A. Vdovin and Yu. M. Sorokin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 6 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1220-1226 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The collective mode of optical breakdown in an aerosol medium with attendant evaporation of the aerosol and the subsequent plasma evolution are analyzed theoretically on the basis of an approximate mathematical model. Its equation of heat conduction with distributed heat sources and equation of continuity are formulated with appropriate initial and boundary conditions for the temperature field, the velocity field, and the vapor flux field. Collective evolution and spark dynamics are simulated accordingly for an inner aerosol particle between two neighboring plasma microflares. The problem is solved with gas dynamic interactions in the system first disregarded according to the diffusion model of vapor flow and then included phenomenologically. In the latter case the strong temperature dependence of the diffusion coefficient is taken into account in the form of a three-halves power law at atmospheric pressure and the edge of the high absorption region at every instant of time is defined by the maximum temperature gradient. Author

N84-26829# Joint Publications Research Service, Arlington, Va.
ON THE POSSIBILITIES OF SINGLE-ANTENNA IONOSPHERE SOUNDING Abstract Only **c32**
A. M. Silayev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 6-7 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2097-2101 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A difference from the approved processing, characteristic of radars with continuous radiation is considered. Expressions are derived for an effective signal and for noise connected with switching. An analysis of these expressions makes possible a comparison with radars using continuous irradiation and with pulse modulation radars. To some degree the system considered for sounding the ionosphere with random switchings with transmission at reception is an intermediary between a system with a continuous radiation of radio waves and a pulse modulation system. In comparison with detection and ranging continuous signals, the regime considered makes it possible to reduce the number of antennas to one and to reduce the amount of noise from the direct transmission signal. This is attained at the cost of a decrease of the level of the most valid signal. In comparison with pulse modulated systems, the possibility is realized of reducing the minimum sounding distance. The magnitude of the valid signal both increases as well as decreases as a function of the station parameters. Author

N84-26830# Joint Publications Research Service, Arlington, Va.
ELECTRODYNAMIC ANALYSIS OF ACTIVE WAVE-GUIDE SLOT LINE BASED ON GaAs Abstract Only **c32**
V. Ye. Lyubchenko and G. S. Makeyeva *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 7 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2102-2107 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

An active waveguide-slot line (WSL) based on semiconductor substrates (gallium arsenide) was investigated, taking into account the action of physical effects appearing during the application of a constant strong electrical field. The following items are considered: (1) method of analysis of active semiconductor waveguiding structure; (2) parameters of WSL and field in dynamic approximation; (3) propagation characteristics of electromagnetic wave in active WSL with presence of strong field domain; and (4) influence of space charge waves. Author

N84-26831# Joint Publications Research Service, Arlington, Va.
ON THE PROBLEM OF CYLINDRICAL ARRAY RADIATION THROUGH INHOMOGENEOUS DIELECTRIC LAYER Abstract Only **c32**
S. V. Kashin and V. N. Sergeyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 7-8 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2273-2276 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A method is considered for elimination of the amplitude control in a cylindrical phased-array antenna (PAA). The essence of the proposed solution involves combination of the cylindrical PAA with a ring shaped radial-nonhomogeneous lens. In an approximation of a geometric optics antenna system it is possible to assure circular scanning with a low level of fringe and backscatter radiation, with control only by the phase method. A two dimensional cylindrical antenna array, surrounded by a ring shaped layer of nonhomogeneous dielectric with an index of refraction, varies according to the law n(r) = R(2)/r where R(sub 2) is the exterior radius of the ring-shaped layer. In comparison with the traditional cylindrical PAA in which the radiative elements are positioned only on the illuminated surface, the antenna system considered here gives a gain and a flux density of power P (sub O) in the principal ray without significant deterioration of the directional properties of the system. Thus, use of the elements positioned on the shady side leads to an increase of P (sub O) by 63%. At the same time the directive gain weakly changes. Author

N84-26832# Joint Publications Research Service, Arlington, Va.
CONCERNING Q OF A CYLINDRICAL DIELECTRIC RESONATOR SCREENED BY A WAVEGUIDE Abstract Only **c32**
V. F. Vzyatyshev and V. I. Kalinichev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 8 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2277-2279 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A large number of works are devoted to screened dielectric resonators. Principal consideration is given to a numerical investigation of the dependence of the elements of a scattering matrix on various parameters of the structure. The peculiarities of screened dielectric resonators are considered from a different aspect: the dependence of the Q of oscillations with a different azimuth-index on the size of the screen waveguide, and the unusual nature of the quest for a Q of oscillations in a screened system and the Q of an unscreened dielectric resonator in free space are investigated. Author

N84-26833# Joint Publications Research Service, Arlington, Va.
TRAJECTORIES OF RADIO WAVES IN LINEAR LAYER WITH ISOMETRIC INHOMOGENEITIES Abstract Only **c32**
S. M. Golynskiy and G. N. Khlybov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 8-9 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 62-64 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The trajectories of radio waves in a statistically non-

homogeneous medium such as a linear ionospheric layer are estimated, taking into account their perturbation by local inhomogeneities. Assuming that the trajectories do remain in the plane of incidence, the deviation of the most probable trajectory from its unperturbed path in accordance with Snell's law is calculated for three models of wave diffusion as a Markov process (D-diffusion). The results are useful for design and operation of radio communication lines, calculation of the maximum usable frequency, and other applications. Author

N84-26834# Joint Publications Research Service, Arlington, Va.
STATISTICS OF FIELD OF MULTISTAGE PHASED ANTENNA ARRAY Abstract Only c32
A. G. Antipin and L. A. Dozorets *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 9 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 14-18 Original language document was announced as A84-25436 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Closed-form expressions are obtained for the mean radiation pattern, the mean directive gain, and the power variance of the radiation pattern of a multistage phased array in the presence of phase errors in the feed system. The statistical characteristics are analyzed for the example of an equidistant linear array. B.J. (IAA)

N84-26835# Joint Publications Research Service, Arlington, Va.
DETECTION OF SPACE-TIME SIGNAL WITH SCATTERING FROM BACKGROUND OF ISOTROPIC NOISE FIELD Abstract Only c32
V. A. Bogdanovich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 10 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 21-23 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Detection of a space time signal, scattered in space, in time, and in frequency is considered. The transmission channel is assumed to be linear and to have finite bandwidths L and F, where L is the dimension of the antenna aperture, F is the bandwidth of the radio section. The signal is considered to be narrow-band (F/f (sub o) = to or < 1, f (sub o) is the carrier frequency), the antenna aperture is large (L/lambda (sub o) = to or > 1, lambda (sub o) is the length of the wave of the carrier oscillations). An invariant principle of detection is obtained which ensures steady detection conditions in the case of a priori uncertainty with respect to the channel and the level of the noise field. Author

N84-26836# Joint Publications Research Service, Arlington, Va.
RADIOCHANNEL WITH CURVED ANTENNA UTILIZING THREE-DIMENSIONAL EXCITATION Abstract Only c32
N. F. Maksakov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 10 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 61-65 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

An antenna array is considered, in the structure of which enters a linear primary element (PE) with a sector theta (sub L) for excitation of M receiving-transmitting modules, arranged equidistantly on a segment of a circle with a radius R. (A diagram of the antenna is presented). The angular position of the i-th of them with reference to the optical axis of the system is determined as theta (sub i) = alpha (sub i) theta (sub L0, where alpha (sub i) = (2(sub i)-M-1)/2(m-1); i = 1,...,M; theta (sub L) = 2 arcsin (L/2R); L - an aperture of the antenna. The path difference delta (sub R) from the center and outer modules to the center of the PE exceeds the spatial correlation interval of the signal. Author

N84-26837# Joint Publications Research Service, Arlington, Va.
CHARACTERISTIC FAULTS OF INPUT STABILIZING AND CORRECTING EQUIPMENT IN TELEVISION TRANSMITTING STATIONS Abstract Only c32
V. D. Shabetnik *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 11 Transl. into ENGLISH from Vestn. Svyazi (Moscow), no. 9, Sep. 1983 p 31-32 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

For the purpose of streamlining the input stabilization and correction in television transmitter stations, a thorough study is made of faults occurring in the equipment and methods are developed for their elimination. The input stabilizing and correcting equipment consists of five basic modules and an automation module. The pulse top or other pulse distortions and parasitic excitation are eliminated through proper selection of fixed resistors or adjustment of variable resistors. Adjustable resistors are also used for setting and regulating the sync signal and the modulation. Distortions of the amplitude/frequency characteristics of modules such as peaking in the high frequency range, and distortions of the transient response characteristics are eliminated by means of compensating choke coils. Distortions of the field frequency pulse and the line frequency pulse are eliminated by proper matching of resistors and capacitors. M.A.C.

N84-26838# Joint Publications Research Service, Arlington, Va.
METHOD OF FLICKER SUPPRESSION IN TELEVISION IMAGE Abstract Only c32
S. V. Novakoskiy, Ye. Z. Soroka, and A. N. Yulish *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 11-12 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 5-10 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A method of flicker suppression in moving television images, namely conversion to higher frequency of fields in image reconstruction, is analyzed from the standpoint of improved filtration and interpolation with reduced distortion. A frequency converter is considered which consists of an analog to digital converter putting out eight bit digital video signals, a synchronized frame memory with storage and readout control, and a digital to analog converter putting out video signals to a video monitor. The signal conversions are tracked along this channel, where the output field spectrum is calculated assuming a time spectrum of the original continuous image in the form of a cosine squared pulse. M.A.C.

N84-26839# Joint Publications Research Service, Arlington, Va.
DISPERSION OF SEQUENTIAL DETECTION TIME FOR SIGNALS SUBMERGED IN AUTOREGRESSIONAL INTERFERENCE Abstract Only c32
G. B. Golfeld *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 12 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 54-56 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The problem of coherent sequential detection of signals submerged in passive interference is formulated statistically as the synthesis of a sequential procedure for testing the interference hypothesis against the unilateral signal plus interference alternative. Since the sample size necessary for decision is a random quantity, it is desirable to shorten the procedure so as to avoid obscuring the Wald likelihood-ratio criterion. The dispersion of sequential detection time then becomes an important parameter, along with the mean detection time. Here both parameters are estimated from the law of alternation of Doppler phases for the case of readings forming an autoregression series of arbitrary order. As the correlation coefficient approaches unity, both mean and dispersion tend to zero for optimum targets and tend to infinity for blind targets. General expressions are derived for both in the case of mutually independent, equally distributed, random elements of the sequence or in the case of a stochastic signal, with zero mean and correlational structure. M.A.C.

N84-26840# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF OPERATION OF FREQUENCY SYNTHESIZER OF TELEVISION RECEIVER WITH MICRO-ELECTRONIC COMPUTER IN A CONTROL CIRCUIT Abstract Only c32
A. V. Krivosheykin and B. Ya. Smirnov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 12-13 Transl.

into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 3-7 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The operation of a digital frequency synthesizer is analyzed in which a microelectronic computer is included in a control circuit. A procedure is examined for calculation of the basic units of the synthesizer, a circuit is proposed for their realization, and requirements on the microelectronic computer are introduced. An analysis is made of the operation of the frequency synthesizer as a pulse system of control, and the conditions of stability and the principal relations which determine the duration of the transient process are obtained. M.A.C.

N84-26841# Joint Publications Research Service, Arlington, Va.
REQUIREMENTS TO BE MET BY PARAMETERS OF HIGH-DEFINITION TELEVISION SYSTEMS FOR CINEMATOGRAPHY Abstract Only **c32**
M. V. Antipin and L. L. Polosin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 13 Transl. into ENGLISH from Tekhn. Kino i Televideniya (Moscow), no. 1, Jan. 1984 p 14-20 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Requirements are discussed which digital high definition television systems must meet in order to postproduce motion pictures with a quality at least as high as attainable conventionally from a 35 mm film. One parameter is format, 5.3 having been established as preferable on account of better utilization of television transmitter tube and television optics, smaller losses, and better resolution without difficulties in conversion. Other parameters based on the eye response characteristics and on the dependence of the subjective (apparent) definition on the actual image resolution are determined. M.A.C.

N84-26842# Joint Publications Research Service, Arlington, Va.
HOW TO CHECK LINE CHANNEL OF IKM-15 DIGITAL PULSE-CODE-MODULATION TRANSMISSION SYSTEM Abstract Only **c32**
G. A. Abramov, M. M. Ptichnikov, and Yu. P. Savchenkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 16 Transl. into ENGLISH from Vestn. Svyazi (Moscow), no. 9, Sep. 1983 p 29-31 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A generator of test signals is developed for checking the line channel of a digital pulse code modulation apparatus in rural telephone networks. The test signal generator consists of a relative group reference generator, a pseudorandom sequence generator and an output amplifier. The test signal generator for checking either a terminal station or an intermediate station of a line channel operates together with an interference generator, both feeding a line simulator. The signal parameters are measured at the transformer output and on the screen of a cathode ray oscillograph. All equipment is designed for an operating frequency of 1.5 MHz and operating voltages up to 10 V. M.A.C.

N84-26843# Joint Publications Research Service, Arlington, Va.
NOISE OF 1/f FORM IN POLYCRYSTALLINE ALUMINUM FILMS Abstract Only **c33**
V. V. Potemkin, I. S. Bakshi, and G. P. Zhigalskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 17 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2211-2216 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The effect of the degree of dispersion of the structure of thin aluminum films at the level of 1/f noise and an analysis of a model of flicker noise due to modulation of the conduction of the crystal by fluctuations of the concentration of lattice vacancies are investigated. The method of investigation and the experimental results, with a discussion of the results, are presented. M.A.C.

N84-26844# Joint Publications Research Service, Arlington, Va.
EFFICIENCY COMPARISON OF QUASI-OPTIMUM DIRECTION FINDING ALGORITHMS USED FOR POINT SOURCES OF SIGNALS Abstract Only **c32**
S. I. Pochuyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 17 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 28-29 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Two quasi optimum direction finding algorithms based on the Markov theory of optimal nonlinear filtration are compared with respect to efficiency. The algorithm of time processing in the Gaussian approximation for signals mixed with additive stationary white noise and the algorithm of spacetime processing for signals mixed with uniform in space white noise are investigated. The radiation pattern of a direction finder is used as basis for comparative evaluation of the algorithms. Calculation of the error dispersion in each algorithm and of the convergence rate of each as function of the signal to noise ratio reveals that the second algorithm becomes increasingly more efficient than the first one as the signal to noise ratio decreases. M.A.C.

N84-26845# Joint Publications Research Service, Arlington, Va.
EVALUATION OF CHARACTERISTICS OF SYSTEM OF SPACE-TIME PROCESSING OF SIGNALS BY STATISTICAL SIMULATION METHOD Abstract Only **c32**
Kh. S. Agodisyan, V. A. Buryak, N. I. Neilo, and K. G. Papushin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 18 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 28-30 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

An evaluation of the degree of deterioration of the detection characteristics of a system of space time processing is investigated with a strict limitation as compared with a linear system, on a background of reverberation noise. Evaluation of the effect of spatial correlation of reverberation noise on the detection characteristics, and the determination of the dependence of detection characteristics on the magnitude of the interval of sampling of the input signals, and selection of this interval are also examined. M.A.C.

N84-26846# Joint Publications Research Service, Arlington, Va.
CONCERNING CRITERIA FOR EVALUATION OF AMPLITUDE-FREQUENCY CHARACTERISTIC OF TWO-SIGNAL SELECTIVITY OF RADIO RECEPTION CHANNEL Abstract Only **c32**
B. G. Telezhnyy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 18-19 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 34-36 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The results of a qualitative evaluation of the nonlinear effects in an ultrahigh frequency receiver of the shortwave band based on an electron tube, field effect and bipolar transistors, performed experimentally, are shown in a table. The table presents the permissible values of the amplitude of the AM noise acting at the AM receiver, the evaluation of which is conducted according to a list of various criteria. M.A.C.

N84-26847# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF ASYNCHRONOUS DETECTOR WITH SELF-PUMPING BASED ON GUNN DIODE Abstract Only **c33**
A. N. Levterov, A. F. Radchenko, and V. I. Krotov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 19 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 37-38 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The results of the operation of an asynchronous detector in the shortwave part of the millimeter range (AD) with self pumping are examined. An expansion of the working frequencies is caused by the use of harmonics of the basic oscillation frequency in a system with a Gunn diode. Asynchronous reception of microwave signals makes it possible to reduce the requirements on the frequency stability of the mixer with self-pumping, which brings

about the use in the AD of a nonresonance load. The AD investigated has a high sensitivity and makes it possible to simplify the circuit in which it is used. M.A.C.

N84-26848# Joint Publications Research Service, Arlington, Va.
SYNTHESIS OF FREQUENCY SPECTRA BASED ON USE OF MULTILEVEL PULSE SEQUENCES Abstract Only c33
A. S. Ananyev and S. N. Popov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 19 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 45-47 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The use of periodic multilevel pulse sequences (MPS) for synthesis of a discrete set of harmonic oscillations (frequency spectra) is investigated. The MPS is a sequence of rectangular pulses with a repetition period T and with an identical duration of each pulse in a sequence to tau. The pulses can be positive, negative, and equal to zero. The number of pulses in a period equal to the ratio tau, is designated through M and is called the length of the sequence. It is possible to use multilevel pulse sequences for both combined and separate synthesis of frequency spectra. An example of the use of this method is provided. M.A.C.

N84-26849# Joint Publications Research Service, Arlington, Va.
METHOD OF ANALYSIS OF COMBINATION OSCILLATIONS OF ARBITRARY NONLINEAR SYSTEM FOR SPECTRUM CONVERSION Abstract Only c32
P. A. Popov and Ye. N. Moshnina *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 20 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 48-49 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

During the formation of signals with specified amplitude-phase characteristics in frequency conversion systems, a problem arises with respect to secondary oscillations, which are the products of a nonlinear frequency conversion of the input action. A method of harmonic analysis is investigated which makes it possible to obtain a general analytical expression for any of the spectral components of the output oscillations with the effect on the arbitrary characteristic of the nonlinear inertialess element of a polyharmonic signal. M.A.C.

N84-26850# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF DURATION OF MULTICHANNEL SEQUENTIAL SIGNAL DETECTION PROCEDURE Abstract Only c32
M. M. Fishman *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 22 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2169-2178 Original language document was announced as A84-22036 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A number of exact and asymptotically exact formulas are obtained for the duration distribution and for the mean duration of a multichannel sequential procedure (MSP) in the case when the statistics formed in different channels of the multichannel system are independent. The derived formulas can be used to investigate the dependence of MSP duration characteristics on the probability of erroneous solutions, and to analyze MSP efficiency as compared with a procedure of fixed duration. B.J. (IAA)

N84-26851# Joint Publications Research Service, Arlington, Va.
TIME CHARACTERISTICS OF SEARCH FOR COMPOUND SIGNALS WITH RESPECT TO DELAY Abstract Only c32
A. A. Fomin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 24 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 53-55 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

On the basis of the theory of Markov chains, a general method is developed for determining the average value and the dispersion of the time of a search for a compound signal with respect to delay, free from the deficiencies of other systems, and suitable for channels with stationary and nonstationary noise, with any number of steps of analysis. M.A.C.

N84-26852# Joint Publications Research Service, Arlington, Va.
NOISE IMMUNITY OF OPTICAL LINES WITH IMPRECISE LEVELS OF SIGNAL AND NOISE Abstract Only c32
V. Yu. Anisimov and E. V. Borisov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 24 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 73-75 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A method of evaluation is presented which is concerned with specified average levels of the signal and noise in the form of imprecise sets. Accessory functions characterize the degree of affiliation of the specified levels of signal and noise with the expected values for the planned Optical Communication Lines. This makes it possible to formalize the subjective concept of the planner with respect to the expected levels of signal and noise which is formed under the conditions of action of a large number of undefined factors. M.A.C.

N84-26853# Joint Publications Research Service, Arlington, Va.
PROCEDURE FOR CALCULATION OF STAGES WITH OPERATIONAL DIRECT-CURRENT AMPLIFIERS Abstract Only c33
G. M. Taranets, B. A. Tonakanov, and N. S. Yefimov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 25 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 78-71 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

In choosing the elements of a stage, it is advisable to take as optimality criteria the minimum values of the sheer stress and its drift and the security of protection of operational amplifiers (OA). A method is proposed in the present paper by which elements of a stage with operational amplifiers are calculated and its parameters with respect to direct current are optimized. A number of calculations for the stage are recommended. Formulas are presented in the Appendix to this paper for calculation of stages with basic type connections of OA. Author

N84-26854# Joint Publications Research Service, Arlington, Va.
MICROPROCESSOR PARALLEL PROCESSING FOR DIGITAL FILTERS Abstract Only c60
A. D. Sotnikov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 26 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Priborostr. (Leningrad), v. 27, no. 7, Jul. 1983 p 37-41 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Contemporary digital data transmission systems and pulse code devices involving digital filters with analog/digital conversion to 512 kHz and more require higher speed processing. However, microprocessor digital filters were found to be slow because filtration algorithm processing was applied in series. Speed was increased by conveyor processing in parallel and the distribution arithmetic method involving simultaneous processing of analogous bits in different inputs. The system increases processing speed, requires a small permanent memory, can change filter characteristics by replacement of less than 10% of the memory and can process signals from a limiting frequency to several hundred kilohertz, thus increasing possibilities for microprocessor digital filters in communication equipment and other highspeed units. Author

N84-26855# Joint Publications Research Service, Arlington, Va.
IMPROVEMENT IN ANALOG ERROR AUTOCORRECTION CIRCUIT Abstract Only c60
R. I. Grushvitskiy, B. A. Manchev, and A. Kh. Mursayev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 26 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Priborostr. (Leningrad), v. 26, no. 7, Jul. 1983 p 42-46 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Analog and digital converter errors can be compensated by autocorrection circuits involving periodic monitoring and matching of output with a standard input by means of an associative memory component. The improved autocorrection circuit has a two-cycle associative memory with double amplification. It significantly improves correction precision and makes possible precise analog and digital converters without expensive components. The circuit was used in a digital/analog converter with automatic nonlinear correction. The error of the original components and of the uncorrected circuit amounted to 5% and us of the circuit reduced the figure to 0.2%. The circuit used without a summator reduced the precision requirement of the amplifier but with a rise in commutation noise in the associative memory. The proposed autocorrection circuit reduced commutation noise to 0.2 mV from 3.5 mV and dropped the memory condensor capacitance tc 1000 microfarads. The total error of the digital/analog converter did not exceed 0.02% of the signal scale. Author

N84-26856# Joint Publications Research Service, Arlington, Va.
PECULIARITIES OF MINIMIZATION OF MIXER NOISE FACTOR Abstract Only **c60**
Ye. N. Anisimov and B. A. Astashkevich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 27 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2266-2272 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Wide use is now made of the methods of computer-aided design during the development of various radioelectronic devices, especially in the field of nonlinear semiconductor electronics. The characteristics of radioelectronic systems, earlier determined analytically, are now found with the assitance of computational methods concerned with many characteristics of systems. During this, the complex nature of an integral function gives rise to definite difficulties during its minimization. The present paper consideres the peculiarities of minimization of such functions computed algorithmically, using as an example the noise factor of a weak-signal mixer based on a diode with a Schottky barrier. Items which hinder use of standard methods of minimization for solution of the class of problem considered are analyzed. A new method is realized in the form of a minimization program, a block diagram of which is shown in a table. The computing time stated in the table corresponds to the solution of the problem on a M-4030 electronic computer; the computing time for one value of an integral function amounted to 5-6 seconds. Use of the program for minimization of the noise factor of a mixer confirmed the high efficiency of the method and made it possible to obtain positive results. B.W.

N84-26857# Joint Publications Research Service, Arlington, Va.
CRITERIA FOR ACCURACY OF ROTARY TRANSFORMERS Abstract Only **c33**
V. I. Bogdanov, G. V. Tazov, and V. V. Khrushchev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 28 Transl. into ENGLISH from Elek. (Moscow), no. 1, Jan. 1984 p 55-56 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The performance of rotary transformers for electronic data processing is analyzed from the standpoint of accuracy. Systematic error include the relative amplitude error caused by step-curve approximation of a sine wave, errors caused by asymmetry of the null points and by residual emfs at the null points, quadrature error, and error caused by a difference between the transformation ratios. Random errors in reproducing four functional relations characterizing the outputs of two secondary windings as functions of the rotor angle, with the two orthogonal primary windings excited alternately, are analyzed statistically with asymmetry of the magnetic circuit and of the electric circuits treated as a probabilistic quantity. The system of random functions is an at least four-dimensional one and treated here as such, in orthogonalization by the Gran-Schmidt method. As the accuracy criterion is selected the resultant vector, the sum of two vectors, characterizing the fluctuation of flux-linkages affecting all coupled coils. B.W.

N84-26858# Joint Publications Research Service, Arlington, Va.
CROSS SECTION FOR ABSORPTION OF PARTLY SHIELDED DIELECTRIC SPHERE Abstract Only **c33**
S. S. Vinogradov and A. V. Sulima *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 29 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1276-1281 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The effect of an ideally conducting spherical metal cup, as a shield, on the microwave absorption characteristics of a dielectric sphere is evaluated on the basis of the known solution to the diffraction problem for a plane electromagnetic wave propagating along the axis of cup and sphere. The Debye electric and magnetic potentials are calculated for the shielded segment of the sphere and for the unshielded remainder of the dielectric sphere, the cup lying either on the front surface or the back surface of the sphere. The problem reduces to two coupled systems of linear algebraic equations of the second kind. The cross section for absorption, equal to the difference between total incident energy flux and scattered energy flux in accordance with power balance or conservation of diffraction energy, has been calculated as a function of kb (k- wave number in free space, b- radius of cup base circle). Numerical results indicate that within the resonance range (b- wavelength of incident radiation) correction must be made to include quasi-natural modes of the shield. A narrow shield behind the sphere increases the overall absorption level in the latter, while a narrow shield before the sphere has almost no effect on the absorption. B.W.

N84-26859# Joint Publications Research Service, Arlington, Va.
ACTION OF EXTERNAL INTERFERENCE-CARRYING FIELD ON NONUNIFORM MULTIWIRE SHIELD Abstract Only **c33**
V. M. Bondar *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 30 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 68-69 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The shielding effect of multiwire meshes against an external interference--carrying field is calculated in terms of the attenuation coefficient A=20LOG absolute value of of 1/s, with s=square root of (p sub r, sh/p sub r, o), p sub r, sh and p sub r, o denoting the radial component of the Poynting vector with and without a shield, respectively. The shielding factor S is evaluated from the general solution to Maxwell differential equations, obtained according to the Bromvich method by superposition of two particular solutions (for transverse electric and magnetic waves, respectively). The shielding coefficient is found to depend not only on the shield structure but also on the form of the external electromagnetic field, namely on the ratio of its axial component to its tangential component. Accordingly, expressions are derived for flexible cylindrical single-layer and double-layer shields around cables, connecting wires, or cords. Author

N84-26860# Joint Publications Research Service, Arlington, Va.
EFFECT OF MULTIFOLD TRAPPING OF CARRIERS ON TRANSIENT PHOTOCURRENT IN AMORPHOUS SEMICONDUCTORS Abstract Only **c33**
V. I. Arkhipov, Yu. A. Popova, and A. I. Rudenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 31 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1817-1822 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

This paper considers the conduct of the density of carriers under conditions of step-by-step generation (continuous illumination) It is shown that this conduct has some interesting features: in particular, the density of mobile carriers determining the transition photocurrent, passes through the maximum before its stationary level is established. The characteristics of the maximum and the form of the curve of the transition photocurrent depend on such important parameters as the depth of the energy distribution of local states, the rate of generation, the capture cross section and

recombination, etc. Thus, by interpreting the experimental data on photoconductivity in terms of theory presented later, it is possible to obtain information concerning energy-band structure and the parameters of real disordered materials. Specimens of high resistance materials, illuminated by light or exposed to the action of some kind of ionizing radiation, are considered. The illumination (or irradition) beginning at the moment t = 0, continuously and uniformly with respect to volume generates G electron-hole pairs in unit volume in unit time. B.W.

N84-26861# Joint Publications Research Service, Arlington, Va.
VARIATION OF CARRIER CONCENTRATION CAUSED BY BAND STRUCTURE RECONSTRUCTION IN TELLURIUM AND TIN-DOPED Al(x)Ga(1-x)As SOLID SOLUTIONS Abstract Only **c76**

M. A. Malyshkin, D. V. Galchenkov, M. A. Grankin, S. A. Bondar, and V. N. Vigdorovich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-0070 29 May 1984 p 32 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1748-1751 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

This paper studies the nature of the distribution of the concentration of free electrons in epitaxial layers of al sub x Gq sub 1 -X. As which were doped to various degrees by tellurium or tin. Study of the electrical properties of solid solutions was conducted on epitaxial layers with a thickness of 50-60 micrometers and a composition varying in the limits 0.3 < or = x< or = 0.6. The layers were grown by the liquidphase epitaxy method in the temperature interval 1020800 C. It is established that the complex nature of the distribution of the concentration of free electrons does not depend on the type of donor impurity. It results from a change of the structure of the conduction band with the composition of the solid solution as well as the interaction of a donor with G-, L- and X-donors of the conduction band. The data obtained show that during preparation of thick low-resistance layers, e.g., of the n-emitters of light emitting diodes on a basis of multipass heterostructures in a system of solid solutions of AL sub X ga sub 1-x as, it is necessary to avoid use of solid solutions with compositions corresponding to minimum values of the concentration of free carriers. Author

N84-26862# Joint Publications Research Service, Arlington, Va.
THE 1/f NOISE IN CONDITIONS OF HIGH GEOMETRICAL MAGNETORESISTANCES Abstract Only **c76**

M. Ye. Levinshteyn and S. L. Rumyantsev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 32-33 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1830-1834 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The paper demonstrates that in conditions where a Hall voltage is absent and a high geometrical magnetoresistance appears in the magnetic field, this relation can be very great, even in moderate magnetic fields. Such a situation is realized in short (L/d < or = 1) specimens (L = distance between contacts, d = dimensions of contact). Measurements in such conditions make it possible with great completeness and certainty to judge concerning the origin of 1/f noise. Two types of specimens produced from epitaxial n-GaAs, which were measured at temperatures of 300, 200, and 77 K, are described. At 300 and 200 K the maximum value of the geometrical magnetoresistance delta rho/rho sub 0 amounted to approx. 1.2 and 2.75, respectively. At 77 K, (delta rho/rho sub 0) sub max approx 15. A conclusion is made concerning the volume nature of 1/f noise. Author

N84-26863# Joint Publications Research Service, Arlington, Va.
NONLINEAR TRANSMISSION OF LASER RADIATION BY ZnTe MONOCRYSTALS AT HELIUM TEMPERATURES Abstract Only **c76**

V. A. Zyulkov, V. P. Gribkovskiy, V. A. Ivanov, and M. A. Katibnikov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 33 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1893-1896 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Saturation absorption in A(II) B(VI) semiconductors under the effect of powerful laser radiation at nitrogen and room temperatures has been investigated in a number of works, in which it shown that the dependence of the transmission coefficient T on the intensity of the incident radiation I sub 0 is determined by the concentration of the impurity, the temperature of the crystal, and the energy position of the levels in the forbidden zone. Specimens ordinarily have residual adsorption, maintained up the threshold of the material breakdown. The present paper investigates the nonlinearity of transmission in the region of helium temperatures, as the result of which it is possible to expect efficient bleaching of crystals with smaller levels of excitation in comparison with T = 77/300 K. This makes it possible to conduct a more detailed comparison of experimental data with the theoretical and to clarify the reasons for incomplete bleaching of semiconductors. Author

N84-26864# Joint Publications Research Service, Arlington, Va.
COMPLEMENTED SCHARFETTER-GUMMEL CONDITION Abstract Only **c76**

A. I. Prokopyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 33-34 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2297-2296 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Machine modeling, based on the solution of a fundamental control system (FCS) is more and more widely used for analysis of semiconductor devices. However, in using particular numerical methods, mathematical limitations exist, one of which is the Scharfetter-Gummel condition described in the IEEE Transactions in 1969: a scheme for a continuity equation, stable only at that time when the difference of potential between adjacent units of the network are not larger than the doubled thermal Boltzmann potential. The cases for applicability of this condition are not specified in the 1969 paper and meanwhile it is incomplete and not always valid. The present brief report is successfully concerned with complementing the formulation of Scharfetter-Gummel conditions for a continuity equation, in writing similar conditions for other methods of approximation of FCS, and also in an indication of the possible cases to which the Scharfetter-Gummel limitation does not extend. Author

N84-26865# Joint Publications Research Service, Arlington, Va.
COUPLING OF CURRENT AND FREQUENCY-MODULATED NOISE IN GUNN OSCILLATORS Abstract Only **c33**

M. D. Vorobyev, S. M. Skliznev, L. P. Smirnov, and A. I. Popov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-0070 29 May 1984 p 34 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2294-2297 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

This brief report is concerned with an experimental investigation of the correlation coupling of the frequency-modulated and current noise of Gunn oscillators at low frequencies of wave selections from the carrier F, as well as refinement of the relations which couple the absolute levels of the noise. A waveguide oscillator served as the object of the investigation, and a Type AA703 diode was used as the active element. The correlation coefficient of the frequency and current fluctuations rho was measured by a method described in a 1977 paper. The results of measurement of rho at various frequencies F are presented. As a whole the values obtained indicate the existence of an appreciable correlation of current and FM noise. Author

N84-26866# Joint Publications Research Service, Arlington, Va.
EQUIPMENT AND RESULTS OF TEST OF COOLER FOR ELECTRO-OPTICAL TRANSDUCER Abstract Only **c33**

M. G. Verdiyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 34-35 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Energ. (Minsk), no. 2, Feb. 1984 p 117-119 (For primary document see N84-26821 17-31)

Avail: NTIS HC A04/MF A01

As is known, one of the various methods for increasing the sensitivity of electro-optical transducers is cooling of its photocathode, which follows from the relationship for thermoelectron emission of photocathodes. At present the thermoelectric method is the most promising, in connection with a low time constant, small overall size and weight characteristics, unrestricted life expectancy, noiselessness, simple control of cooler, etc. Existing conjunctions of the thermopile with the photodiode, as the result of which their use is difficult because of a number of shortcomings. In connection with this, for the purpose in hand, the goal was to move the thermopile and the tube to a distance from one another. During development of the system of heat transfer from the photocathode of the optical transducer to the cooler - the cold junctions of the thermopile, preference was given to closed evaporate systems of heat transfer (evaporative thermal siphons - ETS) with the use of an intermediate heat carrier. B.W.

N84-26867# Joint Publications Research Service, Arlington, Va.
PULSE AND INTERVAL DISTRIBUTOR WITH SENSOR CONTROL Abstract Only **c33**
V. I. Sokolov, Uemilt, W. K. Baliyev, N. S. Kondratev, and B. N. Ivanov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 36 Transl. into ENGLISH from Avtomat., Telemekhan. i Svyaz (Moscow), no. 11, Nov. 1983 p 9-11 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Sensors instead of wafer switches are now used on some multichannel devices for channel selection and have been applied to a unit for pulse and interval measurement. Pulses formed by a distributor during the measurement of code transmitter parameters or by a time pulse generator are fed into an inverter and pass to the counting circuit. The results are shown on the digital display of the instrument after binary-decimal conversion. The distributor operates by means of triggers consisting of a field-effect transistor and a bipolar transistor. A touch on the sensor lowers gate potential in the field-effect transistors. Current flowing through the base of the bi-polar transistor keeps the trigger open. Touch contact is made with a plate protecting the transistors from static charges.
Author

N84-26868# Joint Publications Research Service, Arlington, Va.
ASSURANCE OF UNITY OF TESTS OF SEMICONDUCTOR PRODUCTS Abstract Only **c38**
A. V. Yelyutin, L. P. Kholodnyy, R. I. Genkina, and I. P. Kaganovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 37 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 11-13 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The precision of the triangular method to determine the coordinates of terrestrial objects by the value of the average square error with a fixed base was evaluated. A method to find such an error of determination of coordinates for the case where the base is known with an error substantially smaller than the distance to the object is considered. It is shown that the error to determine the coordinates of an object is increased if the error of measuring the base is taken into account. E.A.K.

N84-26869# Joint Publications Research Service, Arlington, Va.
EVALUATION OF PRECISION OF TRIANGULATION METHOD OF DETERMINING COORDINATES Abstract Only **c43**
N. V. Pavlova and Z. V. Kondakova *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 37 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 37 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The formulation of the problem to guarantee reliable checking of the quality of semiconductor materials like the problem of assurance of unity of tests, reduces to three variations is discussed. Methods are outlined: (1) allowance for the above parameter is rigidly established by the users; (2) the necessity to set up a minimum reliably checked allowance for the given parameter; and (3) a specified allowance for the parameter and an already selected quality of the material. The need to determine the error must o' an individual measurement which assures reliable checking with a given tolerance and accepted evaluation is emphasized. E.A.K.

N84-26870# Joint Publications Research Service, Arlington, Va.
USE OF FIBER LIGHT GUIDES FOR EVALUATION OF PRECISION CHARACTERISTICS OF PULSED LASER RANGE FINDERS Abstract Only **c36**
V. P. Danilchenko, V. A. Kashchey, and L. A. Pospelov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 38 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 38-40 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The metrological properties of fiber light guides (FLG) to validate the possibility of their use in devices intended for certification of contemporary pulsed range finders were studied. The effect of fluctuations of the parameters of a Gaussian light beam which has been introduced into a FLG on the precision of measurement of the time delay by a light guide of an optical pulse was investigated. The evaluations the outlook for the use of FLG in devices for metrological certification of pulsed range finders is shown. The FLG almost completely eliminates systematic error of distance measurement, and by the method of built-in control solves the problem of effective evaluation of the precision characteristics of a range finder. E.A.K.

N84-26871# Joint Publications Research Service, Arlington, Va.
EFFECT OF CERTAIN GEOMETRICAL PARAMETERS ON METROLOGICAL CHARACTERISTICS OF MULTICHAMBER BLACK BODY Abstract Only **c74**
G. N. Tolstykh, V. N. Nalimov, and V. K. Vertushkin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 38 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 40-42 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Multichannel principles are used in the creation of a model black body (BB) with a large radiating surface. It is shown that the design of a proposed BB has an aluminum plate, the radiating surface of which is closely dotted with square pyramids. This conserves the good conditions of heat transfer to the elements of the radiating surface and improves the radiation characteristics by a considerable decrease of the effect of the vertexes of the pyramid on the radiation factor and an increases the size of the radiating strip. It is necessary to find a pitch of the cut of the radiating surface elements to allow for the nonuniformity of the temperature at the height of the pyramid and the error or reproduction of the BB radiation by a real radiator would be minimum. The effect of the pitch on the metrological characteristics of the BB is investigated. E.A.K.

N84-26872# Joint Publications Research Service, Arlington, Va.
PHOTOELECTRIC MASTER MEANS OF MEASUREMENT OF ENERGY AND MAXIMUM POWER OF PULSED LASERS Abstract Only **c36**
A. I. Glazov, T. M. Mitrofanov, S. V. Tikhomirov, and V. G. Tyutyunnik *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 39 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 53-55 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Two types of master means of measurement (MMM) - of energy and maximum power - based on the photoelectric principle for conversion of laser radiation are analyzed. The construction of a MMM by modernization and a suitable selection of operational pulse photometers, optimization of their structure, type of operation, service conditions, and reduction of instrumental error by considering the effect of the noninformation parameters of the radiation is examined. The results of metrological certification of FEL-3 and FPL photometers, and a description of the devices are presented. E.A.K.

N84-26873# Joint Publications Research Service, Arlington, Va.
PRECISION PHOTOMETER FOR MEASUREMENT OF LOW LEVELS OF MAXIMUM POWER OF PULSES LASER RADIATION Abstract Only **c36**
V. A. Kostin, V. Ye. Stysin, S. V. Tikhomirov, N. P. Khatyrev, and V. A. Yakovlev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 39 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 55-57 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The construction principles for the means of measurement of low levels of maximum power of pulsed laser radiation, using as an example the development of a photoreceiving device (FPU), which fulfills the function of a comparator in a standard are considered. Photomultiplier tubes and certain types of p-i-n photodiodes are investigated. The principles of construction of pulse photometers and the characteristics of highly precise photometers are presented. E.A.K.

N84-26874# Joint Publications Research Service, Arlington, Va.
MEASUREMENT OF FLUX DENSITY OF SOUND ENERGY Abstract Only **c71**
A. Ye. Vovk, S. P. Klimov, and V. V. Tyutekin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 40 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 67-68 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A method to determine the flux density of the sound energy-W with the use of a system of unidirectional reception in space is proposed. The method is an extension of two papers published in 1975 and 1977. E.A.K.

N84-26875# Joint Publications Research Service, Arlington, Va.
OPTIMUM TIME OF DAY AND NIGHT FOR MEASURING DISTANCES IN TURBULENT ATMOSPHERE WITH OPTICAL RANGE FINDERS (CASE OF HIGH RISE OF LASER BEAM ABOVE GROUND SURFACES) Abstract Only **c36**
V. S. Chudnovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 40 Transl. into ENGLISH from Izv. Vyssh Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1307-1308 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Accurate measurement of distances greater than 10 km, with optical (laser) range finders which presents a problem in geodetic research, are discussed. A modulated laser beam in a turbulent atmosphere was analyzed. Histograms of temperature errors are plotted for diurinal 24 h periods in Central Asia. It is indicated that deviations from a linear temperature profile are largest from 11 AM to 2 PM and smallest from 8 to 11 AM and from 5 to 8 PM. E.A.K.

N84-26876# Joint Publications Research Service, Arlington, Va.
USE OF MICROPROCESSOR TECHNIQUES IN FREQUENCY MEASURING ORGANS Abstract Only **c35**
N. S. Gurov and V. N. Chuvychin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 41 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Energ. (Minsk), no. 2, Feb. 1984 p 23-27 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

A frequency controlled unloading device (AChR) which is multifunctional with complex measuring and logical parts, and with rigorous requirements on the precision and stability parts was examined. The possibility of constructing frequency measuring organs based on microprocessors, for an AChR with expanded functional possibilities as compared with those in existence are considered. Many factors to the values of the present frequency in the system have to be considered in an increase of the effectiveness of an automatic frequency controlled unloading device. Use of a microprocessor system for an AChR allows the construction of a device which satisfies contemporary requirements. With sufficiently high precision, a microprocessor system enables the tuning off of different types of disturbances at the input of the measuring frequency organ. E.A.K.

N84-26877# Joint Publications Research Service, Arlington, Va.
ELLIPSOIDAL MAGNETOSTATIC SHIELD Abstract Only **c33**
M. Ye. Zarudi *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 42 Transl. into ENGLISH from Elektr. (Moscow), no. 1, Jan. 1984 p 29-32 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The shielding factor which was applied to ellipsoidal magnetostatic shields with arbitrary orientation of axes relative to a uniform external magnetostatic field was examined. It is assumed that an ellipsoidal shell has confocal outside and inside surfaces. The corresponding Laplace field equation for the magnetic scalar potential is formulated in elliptical and rectangular coordinates, and the equation is solved by separation of variables for the appropriate boundary conditions. The solution contains Lame functions of the first and second kind. The shielding factor is expressed in terms of its ratios. The shielding factor is simplified by the introduction of the depolarization or demagnetization factor for both outer and inner ellipsoids. This expression is put in a form adaptable to special cases of spherical and spheroidal and cylindrical and other shields. E.A.K.

N84-26878# Joint Publications Research Service, Arlington, Va.
TWO-STAGE REGENERATIVE MICROWAVE AMPLIFIERS WITH REDUCED NONLINEAR DISTORTIONS Abstract Only **c33**
V. B. Tekshev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 43 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 64-67 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Characteristics of reflection type regenerative microwave amplifiers using Gunn-effect diodes, IMPATT diodes, or tunnel diodes with reduced third order intermodulation were calculated. A sinusoidal voltage across the nonlinear element of negative conductance diodes or a sinusoidal current through the nonlinear element of negative resistance diodes were assumed. The saturation power, equal to the nominal power of the signal source, at which the power transmission coefficient differs by 1 dB from the small signal power transmission coefficient, is calculated first for the simplest case of an amplifier which consists of an ideal circulator and an active nonlinear element, with the nonlinearity and for an input signal which consists of a fundamental component and a third harmonic only. Two real nonlinear elements with a soft oscillation characteristic are considered. It is revealed that the saturation power is most effectively increased by staging. It is shown that the power of third order intermodulation components does not depend on the matching circuit and that the power transmission coefficient varies only slightly with varying gain distribution over amplifier stages. E.A.K.

N84-26879# Joint Publications Research Service, Arlington, Va.
PHASE INVERTER BASED ON DIELECTRIC STRIPLINE WAVEGUIDE WITH MOBILE METAL PLATE Abstract Only **c33**
B. A. Murmuzhev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 44 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 71-72 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The 110-170 GHz frequency range of the parameters of a phase inverter with a dielectric stripline waveguide (DSW) with an imbedded in a substrate dielectric waveguide and a plane metal plate, mobile perpendicularly to the upper surface of the DSW was investigated. It is found that phase inverter has better parameters concerning direct loss (alpha = 2 db), input standing wave ratio (< 1.05) and precision of indication of the phase difference magnitude (- or + 3 deg), than foreign analogs. E.A.K.

N84-26880# Joint Publications Research Service, Arlington, Va.
AUTOMATIC MEASUREMENT OF BANDWIDTH OF MI-

CROWAVE RESONATORS Abstract Only c33
Ye. P. Metsner *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 44 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 84-86 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

The characteristics of a device for simultaneous automatic measurement of the resonance frequency and the bandwidth of a microwave resonator were analyzed. The operation is based on the phase method of measurement of Q. The essence of the method consists of measurement of the phase difference of the envelopes of the AM microwave signal after passage through the resonator during tuning of the microwave oscillator to its resonance frequency. The phase method of measuring Q allows automatic measurement of the resonance frequency and the bandwidth of this microwave resonator. E.A.K.

N84-26881# Joint Publications Research Service, Arlington, Va.
TRANSFORMERS WITH VOLTAGE REGULATION FOR ELECTRIC SUPPLY NETWORKS Abstract Only c33
I. V. Yakimets, V. G. Narovlyanskiy, and V. M. Matveykin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 45 Transl. into ENGLISH from Elektr. (Moscow), no. 1, Jan. 1984 p 1-5 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Power transformers for electric supply networks in which the necessary voltage regulation and compensation of reactive power are effected through switching of the magnetic flux by superconducting shields are described. The performance characteristics, including the shielding action, are analyzed for appropriate equivalent circuit diagrams and the corresponding system of Kirchhoff equations. Voltages and currents are calculated by matrix notation. With the shield impedance ratio Z sub sh/jwL sub sh variable from 0 to oo, the transformer input impedance and output voltage is regulated simultaneously. E.A.K.

N84-26882# Joint Publications Research Service, Arlington, Va.
STABILITY OF FUSES UNDER CYCLIC LOAD Abstract Only c33
K. K. Namitokov and I. G. Shklovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 46 Transl. into ENGLISH from Elektr. (Moscow), no. 1, Jan. 1984 p 46-49 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Thermal stresses in fuses, stimulated by the high degree of mechanical stiffness and the cause of low stability under cyclic current loads, can be reduced by reducing the stiffness of the fuse element, which is typically a strap welded to contact caps at both ends. It is indicated that the stiffness can be reduced by increasing the length and decreasing the cross section. A thin strap consists of flat and bend segments. Simple bending and multiple bending were evaluated. It is indicated that bent fuse segments are less stiff than straight segments, that the relation between stiffness and amplitude of the bend is an inverse power law with the amplitude to a power much higher than squared, that the decrease of overall stiffness is approximately proportional to the number of bends, and that rectangular or circular bending reduce the stiffness most efficiently, inasmuch as such contours envelop the largest areas on the basis of fixed length. E.A.K.

N84-26883# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF PLANE PHASED ARRAY OF PIEZOELECTRIC TRANSDUCERS WITH ONE-LOBE DIRECTIVITY DIAGRAM Abstract Only c33
V. M. Moskalev, Yu. L. Oboznenko, Ye. N. Smirnov, and V. A. Yakovlev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 48 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2292-2294 Original language document was announced as A84-22051 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

Experimental results are presented which demonstrate that it is possible to construct plane phased arrays of piezotransducers with a one lobe directivity pattern, operating on a solid state acoustic line. The device comprises relatively thick buffer layers made of materials whose sound velocities differ slightly and whose acoustic impedances are close to the impedance of the acoustic line: the phase character of each buffer is linear. The characteristics of the array are measured using an acousto-optic deflector. E.A.K.

N84-26884# Sunpower, Inc., Athens, Ohio.
GAS-FIRED DUPLEX FREE-PISTON STIRLING REFRIGERATOR Annual Report, Nov. 1982 - Oct. 1983
I. Urieli Dec. 1983 28 p
(Contract GRI-5081-241-0604; Sunpower Proj. 1700)
(PB84-171537; GRI-84/0022) Avail: NTIS HC A03/MF A01 CSCL 13A

The duplex free-piston Stirling refrigerator is a potentially high efficiency, high reliability device which is ideally suited to the home appliance field. As a gas-fired refrigerator. It has significant advantages over other equivalent devices, freedom from halogenated hydrocarbons, extremely low temperatures available at a high efficiency, and simple burner system control. The design and development of a portable working demonstration unit is described. A necessary factor in the development of a Stirling prime mover system is the use of a sophisticated computer aided development code. This requires continued interaction between the theoretical analysis and practical testing and evaluation. The technical approach was designed around this requirement. A universal test and evaluate the major subunits, subsequently enabling a smooth system integration phase and a verified baseline for future system scaling. GRA

N84-26885# Michigan Technological Univ., Houghton. Dept. of Mechanical Engineering and Engineering Mechanics.
STOCHASTIC MODELING OF EDM WITH A VIEW TO OFF-LINE OPTIMIZATION Final Report
S. M. Pandit, K. P. Rajurkar, and B. Venkatapathy Jan. 1984 238 p refs
(Grant NSF MEA-79-17999)
(PB84-162296; NSF/MEA-84001) Avail: NTIS HC A11/MF A01 CSCL 13H

The working principle of electrical discharge machining (EDM) is discussed and its importance to the manufacturing industry is emphasized. Current research thrusts are outlined, and the need for the proposed methodology, Data Dependent Systems (DDS), to deal with the random and complex nature of EDM, is cited. A pilot experiment carried out to collect surface profiles for characterization by DDS models is described and the main experiment designed to verify erosion rate and surface roughness formulas is examined. The derivation of expressions for melt depth and radius of a crater are given in terms of machining parameters and material properties. Attempts to identify the distinguishing features of arcing and sparking and their use in developing a strategy for online computer contol of EDM are explored. Possible adaptive control strategies based on these features are proposed. Author (GRA)

N84-26886# Management Science Associates, Los Altos, Calif.
EVALUATION OF SURFACE STORAGE FACILITIES FOR EXPLOSIVES, BLASTING AGENTS AND OTHER EXPLOSIVE MATERIALS Open File Report, 22 Sep. 1981 - 1 Jun 1983
J. Roth 1 Jun. 1983 79 p
(Contract DI-BM-J0-318071)
(PB84-168392; BM-OFR-45-84) Avail: NTIS HC A05/MF A01 CSCL 08I

The histories of recent and past magazine explosions were reviewed; present explosive storage conditions and practices were observed; and existing Federal regulations on explosive storage were examined. A recent increase in magazine explosion frequency must be attributed to a large increase in deliberate explosions; fires of various origins account for the remaining explosions of the past decade. During 1884-1926 several lightning generated explosions occurred in nonmetal magazines. It appears that the contents of a well constructed metal magazine are immune to direct lightning strikes, regardless of whether the magazine is

grounded or not. Grounding a metal magazine cannot be harmful, but it maywell be superfluous. Mine Safety and Health Administration and Bureau of Alcohol, Tobacco and Firearms standards on explosive storage appear to cover safety aspects adequately. Certain revisions are recommended to clarify some of the standards and to reduce inconsistencies in their enforcement. GRA

N84-26887*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PERFORMANCE CRITERIA GUIDELINE FOR THREE EXPLOSION PROTECTION METHODS OF ELECTRICAL EQUIPMENT RATED UP TO 15,000 VOLTS AC Open File Report, 15 Aug. 1981 - 1 Dec. 1982
Larry Joe Linley, Alton B. Luper, and James H. Dunn Dec. 1982 64 p refs
(Contract J0318081)
(NASA-TM-85528; NAS 1.15:85528; PB84-172303; BM-OFR-60-84) Avail: NTIS HC A04/MF A01 CSCL 08I

The Bureau of Mines, U.S. Department of the Interior, is reviewing explosion protection methods for use in gassy coal mines. This performance criteria guideline is an evaluation of three explosion protection methods of machines electrically powered with voltages up to 15,000 volts ac. A sufficient amount of basic research has been accomplished to verify that the explosion proof and pressurized enclosure methods can provide adequate explosion protection with the present state of the art up to 15,000 volts ac. This routine application of the potted enclosure as a stand alone protection method requires further investigation or development in order to clarify performance criteria and verification certification requirements. An extensive literature search, a series of high voltage tests, and a design evaluation of the three explosion protection methods indicate that the explosion proof, pressurized, and potted enclosures can all be used to enclose up to 15,000 volts ac. Author (GRA)

N84-26888# Joint Publications Research Service, Arlington, Va.
WEST EUROPE REPORT: SCIENCE AND TECHNOLOGY
4 Jun. 1984 60 p refs Transl. into ENGLISH from various West European articles
(JPRS-WST-84-018) Avail: NTIS HC A04/MF A01

This serial report contains news items, abstracts and articles of scientific reports including aerospace, advanced materials, biotechnology, civil aviation, computers, microelectronics, scientific and industrial policy, and technology transfer. For individual titles, see N84-26889 through N84-26894.

N84-26889# Joint Publications Research Service, Arlington, Va.
SECOND ARIANE LAUNCH PAD AT KOUROU, BELGIAN PARTICIPATION **c14**
Paul Dominique *In its* West Europe Rept. Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 4-7 refs Transl. into ENGLISH from La Libre Belgique (Brussels), 6 Mar. 1984 p 11 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

The Ariane launch facility was design to permit launches with all the safety, flexibility and efficiency necessary to place a payload in orbit. The facility basically includes two subsystems: the Ariane Launch Complexes (ELA) 1 and 2 (under construction) which include all the specific installations necessary for final assembly, inspections and the Ariane launch operations, and the Payloads Preparation Complex (EPCU) which designates the means made available to users for the preparation of satellites. B.G.

N84-26890# Joint Publications Research Service, Arlington, Va.
SWEDEN'S STU PROPOSES FUNDING FOR METALS, CERAMICS APPROACH **c23**
In its West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 8-9 refs Transl. into ENGLISH from Tek. i Tiden (Stockholm), 1983 p 10 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

The STU (National Swedish Board for Technical Development) plans to invest 320 million kronor in materials technology. A comprehensive study concerning the anticipated future development of construction material for the engineering and construction industries was conducted by the STU. Author

N84-26891# Joint Publications Research Service, Arlington, Va.
NEW MATERIAL, PROCESS SPINS OFF FROM VOLVO LCP 2000 PROGRAM **c33**
In its West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 12-14 refs Transl. into ENGLISH from Plastform Scandinavia (Helsingborg, Sweden), no. 1/2, 1984 p 46-47 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

Wet extrusion is not entirely new as a method, but Jotun and Volvo have improved the reinforced plastic to an extremely high surface finish. Material and method studies for production of prototype cars; further development of the SMC (sheetmolding compound) techniques for large scale series production; and development of a new technique for series production of flat body details were discussed. B.G.

N84-26892# Joint Publications Research Service, Arlington, Va.
SIEMENS PLANS 256 K MEMORY CHIP TO CATCH UP WITH JAPAN **c60**
Ulf Peter Hellstrom *In its* West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 38-40 refs Transl. into ENGLISH from Aftenposten (Oslo), 19 Mar. 1984 p 27 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

A decision to invest great resources in the development and manufacture of the small silicon pieces, or chips was made by Siemens. In an effort to catch the world market, a budget of DM 1.4 billion, or about 4 billion Norwegian kroner was alloted construction of two pilot installations and two production facilitied is planned. The prototype of the first megabit chip is to appear in 1986. B.G.

N84-26893# Joint Publications Research Service, Arlington, Va.
SIEMENS STRATEGY INCLUDES DM 1 BILLION FOR SUBMICRONS IC'S **c60**
In its West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 41-42 refs Transl. into ENGLISH from Handelsblatt (Dusseldorf), 6-7 Apr. 1984 p 17 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

The four goals of Siemens in microelectronic equipment are: to increase productivity, improve the quality of the product, shorten the contract fulfillment time and enhance flexibility. By the end of the decade it is expected that a 4-m bit memory component will be achieved in CMOS technology. A further key technology is optical communications technology. Optical systems having transmission rates of over 560 Mbit/sec are new state of the art. B.G.

N84-26894# Joint Publications Research Service, Arlington, Va.
DESCRIPTION OF FRG BASIC RESEARCH IN X-RAY LITHOGRAPHY **c33**
Franz Frisch *In its* West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 43-46 refs Transl. into ENGLish from Die Zeit (Hamburg), 23 Mar. 1984 p 31 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

The role of X-ray optics in the future of computer chips is discussed. Mass production of highly integrated computer chips by means of X-ray lithography is expected to start as early as the first half of the nineties. Research and development needed to meet that deadline are examined. B.G.

N84-26895# Joint Publications Research Service, Arlington, Va.
USSR REPORT: ENGINEERING AND EQUIPMENT
13 Apr. 1984 59 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UEQ-84-003) Avail: NTIS HC A04/MF A01

The reduction of mass transfer during the friction of bronzes

and other improvements in industrial technology are highlighted. Investigations in turbine and engine design, the development of navigation and guidance systems, fluid mechanics, and the mechanics of solids are also summarized. For individual titles, see N84-26896 through N84-26954.

N84-26896# Joint Publications Research Service, Arlington, Va.
ECONOMICS OF INSTALLATION OF SOLAR HEATING PLANTS Abstract Only c44
O. S. Popel, S. Ye. Frid, and E. E. Shpiltayn *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 5 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Energ. i Transp. (Moscow), no. 5, May 1983 p 147-151 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An engineering-economic analysis of solar heating plants for determination of their cost effectiveness involves calculating the maximum economically feasible extra capital investment on their installation and calculating the fraction of the total heat demand covered by such a plant which makes replacement of conventional heating plant maximally economical. The annual economic effect of solar heating is calculated in terms of normalized cost differential, as criterion for its competitiveness with conventional heating. Plant performance characteristics, namely dependence of both the percent demand coverage and the annual cost differential on the area of solar radiation collectors is then considered. Analysis of the cost equation, assuming that the extra fixed cost is proportional to the collector area, reveals the necessary and sufficient condition for decrease of annual operating cost. Author

N84-26897# Joint Publications Research Service, Arlington, Va.
IMPROVEMENT OF SURFACE PLANING WITH DIAMOND TOOL Abstract Only c37
A. A. Mikhaylov, V. V. Pleshakov, V. V. Andrianov, and Yu. N. Savitskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 6 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 59-61 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Planing steel surfaces not harder than Rc 45 with tools made of synthetic diamond (ASV, ASPK-3) is examined from the standpoint of improving the effectiveness by the use of two indenters rather than one. Outside surfaces of cylinders are considered. Three different schemes are compared: (1) the two indenters diametrically on opposite sides of the surface, with different normal forces and forward feeds for each; (2) both indenters on the same side of the surface, separately one behind the other, with different normal forces but the same forward feed set for each; (3) both indenters on the same side of the surface held securely in a common spring-mounted fixture by set screws. Four main surface quality indicators are evaluated for each scheme on the basis of regression analysis of statistical data on planing of 30KhGSN2A steel with use of lubricant-coolant fluid, these indicators being: roughness, microhardness, degree of surface hardening, and residual stress level in a surface layer of a thickness not exceeding 10 micrometers. Author

N84-26898# Joint Publications Research Service, Arlington, Va.
UTILIZATION OF SELECTIVE MASS TRANSFER FOR INCREASING PERFORMANCE CAPABILITY OF HINGES SUBJECT TO HEAVY LOADS Abstract Only c39
D. G. Gromakovskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 7 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 48-50 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Regular changes in hardness, density, and stressed state of the surface-layer material during deformation and the structural effect of plastic deformation on polycrystalline materials stimulate mass transfer in friction-couples under heavy dynamic loads. Experimental data were obtained on hinges with regular surface relief and hexagonal groove arrays, the pair of materials in friction being BrAZhN 10-4-4 aluminum-iron-nickel bronze and steel. The lubricant was TsIATIM-201 without additives and with up to 5% fluorocarbon added. Results indicate that the wear resistance of plating films can be increased by 30-35% and that the plating ingredient should be preferably introduced in the form of metal salts rather than powder. Surface oxidation, which prevents selective mass transfer, is inhibited by an active fluorocarbon facilitating the chemomechanical interaction of friction surfaces and plating ingredient so that the mass transfer becomes more stable and the bond of plating film to substrate metal becomes stronger. A.R.H.

N84-26899# Joint Publications Research Service, Arlington, Va.
NOVEL METHOD OF ASSEMBLING LARGE MULTICOMPONENT MACHINE SETS Abstract Only c37
A. I. Zhabin and M. Ya. Brovman *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 7-8 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 52-55 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A method of assembling multicomponent machine sets is based on minimization of power loss in transmission (USSR Patent disclosure No. 823,059). Its principle is explained and demonstrated on assembly of a test stand comprising a set of three separately mounted machines; a test cage driven by an electric motor through a speed reducer. A clutch coupling the motor to be speed reducer, and a clutch with a brake coupling the speed reducer to the test cage. The assembly process begins with fixing the motor base and continues with alignment of the shafts. The problem of power loss minimization is formulated as an optimization problem for a criterion functional of four variables; two axial misalignments, vertical and horizontal, and two skew angles. This problem is solved on the basis of 3-level 4-factorial experiments by the probability method of establishing the position which corresponds to minimum power loss, along with the range of equiprobable detection of systematic positioning errors. Author

N84-26900# Joint Publications Research Service, Arlington, Va.
NOVEL TECHNOLOGICAL SOLUTIONS TO TREATMENT OF THREADS IN MICROMETRIC MEASURING TOOLS Abstract Only c37
V. V. Matveyev and G. A. Malkov *In its* USSR Rept.: Eng. and Equipment (JpRS-UEQ-84-003) 13 Apr. 1984 p 8 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 55-57 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Analysis of errors in mating microthreads of the screw-and-nut type on the basis of a geometrical model describing such a kinematic pair reveals the predictable limits of threading precision and suggests technological ways to improve the threading precision. Special tools for finish thread cutting include two taps for cutting precision microthreads in sleeves made of aluminum-iron bronze, brass, or steel not harder than Bhn 200, one of them with guide-cutter bits and the other with a guide separately in front duplicating the thread precut by a rough threading tool. Finishing tools include a shaver with precise cutting edges and chip collecting grooves and a honer with small threaded planks and bilaterally chamfered teeth. A quality control procedure provides for corrective treatment and salvage rejects. The metal surface of the tool is decontaminated, then MoS2 is deposited on it and the tool is passed over a mating part so that this solid lubricant presses on the surface and fills cavities in it. The resulting smooth surfaces of the microthread pair are additionally lubricated. Author

N84-26901# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF REALIZABILITY OF SELECTIVE MASS TRANSFER DURING FRICTION OF ALUMINUM BRONZES AGAINST STEEL ON COMPOSITION OF LUBRICATING FLUID Abstract Only c37
I. V. Kragelskiy, L. I. Kuksenova, V. I. Tolokonnikov, A. I. Berdenikov, and L. M. Rybakova *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 9 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 46-47 (For

primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The friction of BrAMts9-2 aluminum-manganese bronze against St45 carbon steel with various fire-resistant lubricants was tested for realizability of selective mass transfer on a 77MT-1 machine in reciprocating motion, at constant sliding velocity of 0.1 m/s and under constant specific pressure of 10 MPa as well as at constant temperature. Fire-resistant lubricants used were P10-2 water-glycol mixture and P2OMI water-glycerin mixture, with and without additives. The wear was measured by weighing on an ADV-200M analytical balance. Before and after tests, each specimen was examined for microhardness and, by X-ray microphotometry, for layerwise phase composition and crystal structure. Results indicate that water-glycerine without additives, unlike water-glycol mixture and spindle oil, is not a sufficiently adequate selective solvent of precipitating secondary components such as the alpha(2)-phase solid solution in the case of bronzes with high aluminum content and that its additives altogether inhibit anodic dissolution. Author

N84-26902# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF REALIZABILITY OF SELECTIVE MASS TRANSFER DURING FRICTION OF TIN BRONZES AGAINST STEEL IN HYDRAULIC SYSTEM MECHANISMS ON CONCENTRATION OF ALLOYING ELEMENTS Abstract Only **c37**
L. M. Rybakova, L. I. Kuksenova, V. M.. Samylkin, A. I. Berdenikov, and I. V. Kragelskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 9-10 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 44-45 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Six industrial tin bronzes and St45 carbon steel were tested in a 77MT-1 machine in reciprocating motion, with average sliding velocity of 0.1 m/s and under specific pressure of 10-30 MPa. Before and after tests each bronze member was examined for microhardness as well as microradiographically for layerwise nondestructive phase analysis. The basis and critical role in the friction and wear process was found to be played by two phases: Cu-Sn alpha-phase solid solution and Cu3lSn8 intermetallic compound, breakup of the former and partial breakup of the latter resulting in formation of Cu3Sn. Results indicate that monophasality and equilibrium of the alloy favor selective mass transfer during friction. High tin or lead content as well as high combined tin and lead content are detrimental to selective mass transfer. A typical example of this is Br0F10-1 bronze, an alloy in nonequilibrium state, wearing at a rate which monotonically decreases with time to a stable low level in spindle oil but jumps up and down without reaching a stable level in water-glycol or water-glycerin. Author

N84-26903# Joint Publications Research Service, Arlington, Va.
ESTIMATION OF WEAR RATE DURING SELECTIVE MASS TRANSFER Abstract Only **c37**
S. A. Polyakov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 10 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 83 p 41-43 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

To calculate wear rate during selective mass transfer in a tribological system, the Gibbs energy equation is written for each friction zone in generalized form. Transition from the description of local equilibrium to a description of nonequilibrium processes yields an expression for the increase of entropy in terms of chemical potentials, electric potential, and work of changing an elementary surface area. The processes involved include diffusion of material components, plastic deformation, adsorption, change of internal energy, change of electric charge, and chemical reactions. On the basis of a criterion for evolution of the tribological state, the Onsager equation is written for the rate of each of these six processes. With hydrodynamic effects disregarded, or simplicity, a solution of this system of six thermodynamic equations yields a simple expression for the rate of chemomechanical wear. Author

N84-26904#. Joint Publications Research Service, Arlington, Va.
ZERO WEAR (SELECTIVE MASS TRANSFER): NEW STEP TOWARD HIGHER WEAR RESISTANCE OF MACHINE PARTS Abstract Only **c37**
D. N. Garkunov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 11 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 83 p 36-41 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Selective mass transfer with resulting zero wear is a mode of friction where a thin semifluid "sustaining" metal film forms spontaneously in the contact zone, with attendent decrease of the friction coefficient. The six factors playing a major role are: (1) increase of the effective contact area and consequent elastic rather than plastic deformation; (2) adsorption of a positively charged surfactant forming a dense film and preventing oxidation of the metal surfaces; (3) full realization of the Rebinder effect causing only the "sustaining" film and not the metal underneath to deform with minimum internal slippage by the diffusion-vacancy mechanism; (4) coating of metal particles in the wear product (copper micelles) by an electrically charged adsorption layer causing them to migrate either into intersurface cavities or from one metal surface to another; (5) polymerization of organic components in the lubricant, after tribodecomposition of the latter, with the "sustaining" film as catalyst; and (6) protection against corrosive-mechanical and abrasive hydrogenous wear. Author

N84-26905# Joint Publications Research Service, Arlington, Va.
PROCEDURE FOR DETERMINATION OF DAMPING CAPABILITY OF TURBOMACHINE BLADES SUBJECTED TO HEAT AND CENTRIFUGAL FORCES Abstract Only **c07**
A. Ya. Adamenko, L. G. Tokar, and V. V. Matveyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 12 Transl. into ENGLISH from Probl. Proch. (Kiev), no. 7, Jul. 1983 p 54-57 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A testing machine is described which was developed to determine the capability of turbine blades to damp vibrations when subject to centrifugal forces and high temperature. Measuring instruments include thermocouples for determining the temperature distribution and strain gauges for determining the blade deflections, at disk speeds ranging from 0 to 900 rpm. Results from tests on blades made of 1Kh13 steel at 0, 7200, 8300, and 90000 rpm. It is indicated that the vibration decrement or damping effect at maximum amplitude of flexural stress decreases with increasing static tensile stress caused by centrifugal forces as well as with rising temperature, being at the maximum temperature and static stress level only about one third of what it is at 20 C and zero static stress (standstill). Author

N84-26906# Joint Publications Research Service, Arlington, Va.
ESTIMATING THERMAL FATIGUE STRENGTH OF PROTOTYPE BLADES IN GAS TURBINE ENGINE Abstract Only **c07**
M. Ye Kolotnikov and S. Yu. Strilets *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 13 Transl. into ENGLISH from Probl. Proch. (Kiev), no. 7, Jul. 1983 p 15-17 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The fatigue strength of gas turbine blades under cyclic thermal loads with cooling was investigated. Blades of prototype sizes made of ZhS6F heat-resistant alloy were heated over the 523-1373 K temperature range in sawtooth cycles and cooled at rate reaching 25 C/s at the hottest blade section. The test data on stress and strain at rupture were correlated with calculations of deformation according to the theory of beams, with the boundary conditions established thermometrically on a special blade specimen and the corresponding equations then solved numerically on a YeS-1033 unified system computer. The results yield the necessary corrections for estimating the thermal fatigue strength and indicate a dependence not only on the temperature swing but also on the peak temperature, the magnitude of alternating stresses being more critical than that of alternating strains. Author

N84-26907# Joint Publications Research Service, Arlington, Va.
DETERMINING ORIENTATION OF SOLID OBJECT Abstract Only **c64**
V. B. Larin and K. I. Naumenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 16 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 3, Mar. 1983 p 24-32 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The orientation of a solid object in a stationary system of coordinates, defined by the coordinates transformation matrix in terms of four Rodrigues-Hamilton parameters, can be determined more accurately with the aid of additional data on the direction of some vector (whose oreintation in this stationary system is known) in a moving system of coordinates. The problem is solved by integrating the kinematic equations and estimating the Rodrigues-Hamilton parameters at discrete instants of time from readings of that vector's projections on the axes of the object. The maximum estimate of the Rodrigues-Hamilton quaternion is obtained as the one which minimizes a certain binomial functional with positive coefficients under the constraint that the norm of this estimate be equal to unity. An algorithm is constructed for numerical integration of the kinematic equations in the Rodrigues-Hamilton parameters. Typical results are shown pertaining to an object which rotates at a constant angular velocity about its x-axis. The procedure involves multiplication of elementary quaternions and processing the readings, with errors, of the vector of the object's angular velocity. Author

N84-26908# Joint Publications Research Service, Arlington, Va.
EQUATIONS IN RODRIGUES-HAMILTON PARAMETERS FOR HEAVY SOLID BODY ROTATING ABOUT FIXED POINT Abstract Only **c64**
V. N. Koshlyakov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 16-17 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 16-25 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Rotation of a heavy solid body about a fixed point 0 not located at its center of mass is analyzed in two systems of coordinates: 0(xi,z,zeta) inertial stationary and 0(xyz) moving with the body. The conventional system of three Euler equations (dynamics) and three Poisson equations (kinematics) are replaced with their Rodrigues-Hamilton analog, with an additional equation obtained by twice differentiating the interrelation between the four Rodrigues-Hamilton parameters. The general result is applied to rotation of a heavy solid body with arbitrary mass distribution and a single stationary point about the vertical axis passing through its center of mass. A modification of the Lagrange spinning top, namely one with A = B = 1/2C (moments of inertia with respect to axes x,y,z respectively) and alpha > 0 (center of gravity above pivot point), is considered as an example. Advantages of this method of analysis are the possibility of rigorous linearization and, in the case of small nutation angles, the absence of singularities. Its disadvantage is the higher order of equations. M.G.

N84-26909# Joint Publications Research Service, Arlington, Va.
EQUATIONS OF SMALL OSCILLATIONS FOR INERTIAL NAVIGATION SYSTEM TAKING INTO ACCOUNT EARTH'S ELLIPSOIDALITY Abstract Only **c04**
Yu. K. Zhbanov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 17 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 51-56 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An inertial navigation system is considered for a platform in a suspension to be horizontally stabilized. The corresponding Euler-Poisson equations of small-amplitude oscillatory motion in the approximation of a spherical earth are refined for ellipsoidality of the Earth by inclusion of the eccentricity as correction factor. The equations are formulated for navigation with not only the instrumental trihedron but also an auxiliary instrumental-geographical one and a dead-reckoning one. The equations are explicated and put in matrix form, expressing the dependence of horizontal stabilization error on errors in the dead-reckoning channel due to ellipsoidality on the Earth. Author

N84-26910# Joint Publications Research Service, Arlington, Va.
MECHANICS OF RIGID GYROSCOPIC SYSTEMS Abstract Only **c35**
D. M. Klimov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 18 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 57-65 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A navigation problem, namely vertical stabilization of a ship with a system of gyroscopes, is analyzed on the basis of the simple example of a ship moving along the equator and its position defined by the meridian angle. The equation of motion for a 'rigid' pendulum is formulated so as to describe small oscillations of the latter at a Schuler frequency. Following a review of previous studies on the mechanics of such systems and of concepts already developed, the conditions for 'rigidity' are established first in general form and then for the specific case under consideration. Next are analyzed the motion of a pendulum with the initial condition for 'rigidity' not exactly satisfied and the motion of a 'rigid' system relative to a system of coordinates with the same origin but one axis passing through the center of the Earth. Author

N84-26911# Joint Publications Research Service, Arlington, Va.
CONTROL OF QUADRIAXIAL CARDAN SUSPENSION Abstract Only **c35**
I. V. Novozhilov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 18 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 66-70 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A quadriaxial Cardan suspension is to be servomechanically controlled so as to stabilize a definite orientation of the platform during arbitrary motion of the frame. The problem is solved with the use of five orthogonal systems of coordinates tied one to the platform, one to each of the three gimbals, and one to the frame respectively. The suspension is assumed to be structurally perfectly rigid and to be part of a gyroscopic indicator-stabilization system. The corresponding dynamic equations are written as equations for angular momenta and several variants of control, for the various rotations, are constructed. One such variant, a more intricate one, is course-vertical control. Dynamic control of the suspension in a stationary frame, to ensure any arbitrarily prescribed angular evolutions of the platform, is also considered and the procedure for constructing such a control is outlined. Author

N84-26912# Joint Publications Research Service, Arlington, Va.
METHOD OF DERIVING EQUATIONS OF MOTION FOR DYNAMICALLY ADJUSTABLE GYROSCOPE Abstract Only **c35**
M. Yu. Shatalov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 19 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 3, Mar. 1983 p 12-18 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The equations of motion for a dynamically adjustable gyroscope are derived in terms of the Lagrange function, of generalized coordinates and velocities and of time, this function assumed to be analytic. The derivation is based on applying an Euler operator to the corresponding Lagrange equation of the second kind and analyzing the Lagrange function as the difference between kinetic energy and potential energy. Linear differential equations of motion are derived in this way, first for a gyroscope with single wheel and then for one with n wheels in tandem. The method is also applicable to derivation of linearized nonlinear equations or their higher-order approximations. Author

N84-26913# Joint Publications Research Service, Arlington, Va.
PROBABILISTIC CHARACTERISTICS OF PERTURBATION TORQUES IN GYROSCOPES WITH ELECTROSTATIC SUSPEN-

SION Abstract Only c35
A. V. Koretskiy and Yu. G. Martynenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 19 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 3, Mar. 1983 p 4-11 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Determining the perturbation torque on the wheel of a gyroscope with electrostatic suspension is treated as a problem in the theory of probability. The wheel is assumed to spherical in form with a randomly nonuniform surface. Such a surface is described by an equation in Fourier series of spherical functions. The electrostatic potential in the gap between the wheel surface and the inside surface of the housing in which the wheel has been suspended is also expressed in the form of a power series in a small parameter with harmonic functions expandable into associated Legendre polynomials of the first kind as coefficients, this electrostatic potential representing the solution to the Laplace equation for the electric field set up by an array of electrodes. The force distribution and then the moment with respect to the center of mass are calculated on this basis statistically, in terms of mathematical expectation and dispersion. The corresponding correlation coefficients are calculated after the correlation function, which depends only on the distance between points on the wheel surface, has been expanded in a Fourier-Legendre series with only cosine terms of the Legendre polynomials. Author

N84-26914# Joint Publications Research Service, Arlington, Va.
ANALYTICAL DESCRIPTION OF HYPERSONIC GAS JET DISCHARGED INTO MOTIONLESS MEDIUM OR INTO SUPERSONIC COMPANION STREAM Abstract Only c02
M. M. Gilinskiy and L. I. Zak *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 21 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 183-186 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An integro-differential equation has been obtained in an earlier study as an approximate analytical description of discharge of a supersonic jet from a diverging nozzle into a flooded space or into a supersonic companion stream, with the power-law profile characterized by an exponent nu = 0,1,2 for flow with respectively plane, cylindrical, or spherical waves. The flow of an ideal thermodynamically perfect gas through a slightly diverging nozzle was assumed not by the method of plane sections but by reduction to a second-order ordinary differential equation for the propagation of an internal 'barrel' density jump. This differential equation is transformed into an integral one where the density jump appears both explicitly in the polynomial part and also under a double integral. Evaluation of the latter by iterations yields the solution in the form of an algebraic equation for nu = 1 (conical nozzle). It remains to determine the point at which the first 'barrel' ends. An interesting special case is that of an underexpanding nozzle.
Author

N84-26915# Joint Publications Research Service, Arlington, Va.
AERODYNAMIC AND THERMAL CHARACTERISTICS OF 3-DIMENSIONAL STELLATE BODIES IN RAREFIED GAS Abstract Only c02
A. I. Bunimovich and V. I. Kuzmenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 21-22 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 181-183 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

In search for the aerodynamically optimum shape of bodies to be launched into space, studies were made of stellate bodies flying at hypersonic velocities through rarefied air at various altitudes. The specific shape under consideration is a body consisting of a regular n-arm star in front and a round back with a smooth transition between them. The aerodynamic drag coefficient and the heat transfer coefficient at the front were calculated and measured as functions of the characteristic relative body width r/L (ratio of radius at midspan to total length) and of the altitude H or air density. Author

N84-26916# Joint Publications Research Service, Arlington, Va.
MATHEMATICAL MODELING OF TRANSIENT SEPARATION FLOW AROUND CIRCULAR CYLINDER Abstract Only c34
S. M. Belotserkovskiy, V. N. Kotovskiy, M. I. Nisht, and R. M. Fedorov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 23-24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 138-147 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A numerical method is proposed for complete solution of the problem of transient separation flow of a viscous fluid around a cylinder. It is based on existing models of a boundary layer and on assuming an ideal medium, and it requires no additional empirical data. The potential flow outside the boundary layer is mathematically modeled by a system of N+1 dimensionless algebraic equations in series form describing the circulation of discrete vortices. At time zero N of these equations represent the condition of impermeability of the cylinder surface and one represents the condition of zero tangential velocity at the stagnation point. For subsequent instants of time the N equations are modified to represent the condition of impermeability at successive points on the surface and the one equation is modified to represent the Thomson theorem of constant circulation around a contour enclosing both the body and its trail. The boundary layer is simulated not only on the front from the stagnation point to the separation point on each side, but also on the rear side with backstreams within the zone between the two separation points there. Viscous flow in the boundary layer is described by the conventional system of differential equations of a nonsteady layer, with both kinematic and eddy viscosity as parameters. Author

N84-26917# Joint Publications Research Service, Arlington, Va.
INTERACTION OF JET DISCHARGED FROM CONTAINER AND OPPOSING SUPERSONIC STREAM OF RAREFIED GAS Abstract Only c02
I. N. Larina *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 132-137 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The problem addressed is the interaction of a supersonic stream of rarefied mono-atomic gas and an opposing jet discharged through a nozzle (radius r) from a spherical container (radius R) in that stream. The flow function, describing the state of the gas, is assumed to satisfy either the Crooke relaxation equation of S-model kinetics. The temperature dependence of dynamic viscosity is assumed to correspond to the Lennard-Jones model of particle-particle interaction. The dimensionless equations of interaction in integral representation, four nonlinear ones for Crooke kinetics or six nonlinear ones for S-model kinetics, are solved by numerical iteration for boundary conditions of unperturbed flow at infinity and diffuse reflection by the outside container surface. The distribution function of discharged gas particles at the nozzle orifice is given. Author

N84-26918# Joint Publications Research Service, Arlington, Va.
METHOD OF CALCULATING STRONG VISCOUS INTERACTION AT DELTA WING Abstract Only c02
G. I. Dudin and D. O. Lyzhin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 25 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 119-124 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A method of iteration is proposed for calculating the parameters of a three-dimensional boundary layer at the surface of a thin delta wing in a hypersonic stream of viscous gas. The model is a semi-infinite equilateral triangular plate oriented at a zero angle of attack, in a Cartesian system of coordinates with the origin at the vortex point and the x-axis as axis of symmetry. The equations of

flow are reduced to a system of equations in two independent variables, through use of self-adjoint variables, with singularities of the flow function in the vicinity of the leading edges accounted for by means of similarity variables. The temperature dependence of dynamic viscosity is assumed to be linear and the Prandtl number appears as a characteristic parameter. The equation are solved by the shearing wedge method. At the beginning of each iteration is given the transverse pressure profile (z- or span coordinate) so that the pressure at both edges equals the pressure of the stream at corresponding points. Iteration proceeds according to the relaxation method, with directions varied to conform with changes in the propagation of perturbations through the backstream regions. The fields of flow functions are calculated which then yield the displacement thickness of the boundary layer. Iteration continues until the calculated pressure profile coincides with the initially stipulated one. Author

N84-26919# Joint Publications Research Service, Arlington, Va.
MIXED BOUNDARY-VALUE PROBLEMS PERTAINING TO PROFILE OF SUPERSONIC NOZZELES AND CHANNELS Abstract Only **c02**
A. S. Boynovskiy and V. I. Kireyev *In its* USSR Rept.: Eng. and Equipment (JPRS)-UEQ-84-003) 13 Apr. 1984 p 25-26 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 83 p 112-118 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Two mixed boundary-value problems are formulated pertaining to two-dimensional supersonic separation flow through channels, problems of profile design, with discontinuities stipulated in the form of either shock waves or contact boundaries. A piecewise-continuous line G representing the C(+) or C(-) characteristic line is given along with the vector-column of a discontinuous gas-dynamic parameter defining a supersonic flow along this line as function of the stream parameter x or as function of the radius-vector r(G) of points on that line, as well as a piecewise-continuous boundary line Q intersecting line G at only one point and confined within the corner between characteristics C(+) and C(-). The given gas-dynamic parameter is the angle between the velocity vector and the longitudinal channel axis theta (X) or theta (r(Q)O in problem 3 and the pressure p(X) or p(r(Q)) in problem 4 (r(Q) radius-vector of points on line Q). An analytical solution of each problem is possible in special cases such as plane flow with uniform initial G characteristic. A numerical solution for other cases by the method of grids and characteristics, with subdivision into X = const layers, was programmed in FORTRAN-4. Author

N84-26920# Joint Publications Research Service, Arlington, Va.
FLOW OF STELLAR WIND PAST X-RADIATION SOURCE Abstract Only **c90**
K. V. Krasnobayev and R. A. Syunyayev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 26 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 106-111 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Stellar wind past an X-ray source is treated as two-dimensional steady flow of a fully ionized plasma containing both protons and electrons. The corresponding equations of hydrodynamics and state, in a cylindrical system of coordinates with temperature as third variable, are solved for a supersonic gas stream. An analysis of the solution for dependence on the distance from the radiation source reveals that as this distance decreases, the amplitude of perturbations increases and near the source the stream becomes subsonic. Numerical integration of these equations must, therefore, be performed over a range several times wider than the critical distance at which radiative heating of the plasma raises its heat content to a level comparable to that of its kinetic energy. The authors also consider changes not only in the plasma temperature but also in the wind ionization content and corresponding changes in the plasma cooling rate caused by deexcitation of ions of heavy elements along streamlines. The results indicate existence of a forward shock wave with a cavity containing hot gas behind the front, and acceleration of the stream within the subsonic region. Author

N84-26921# Joint Publications Research Service, Arlington, Va.
LOGARITHMIC DECREMENT OF OSCILLATIONS OF LOW-VISCOSITY FLUID ROTATING INSIDE CYLINDRICAL VESSEL Abstract Only **c34**
N. K. Radyakin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 27 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 85-92 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A low viscosity weightless fluid which occupies an axisymmetric part of a circular cylindrical vessel and rotates together with the latter at a constant angular velocity in a zero gravitation field is considered to be subject to small normal oscillations about its equilibrium position. The corresponding equations of motion and boundary conditions are written in a cylindrical system of coordinates rotating with the fluid. It is assumed that the fields of velocity and pressure fluctuations vary harmonically and the real part of the complex exponent represents the logarithmic decrement. The latter is calculated, considering that both velocity and pressure fields satisfy the linearized Navier-Stokes equations as well as the condition of incompressibility. The viscosity forces are assumed to be smaller than the capability forces and the latter are comparable with the centrifugal forces. The problem is treated as an asymptotic one with respect to viscosity for the linearized Euler equations and as a variational one for surface waves in an ideal fluid. It is solved by the Ritz method with appropriately selected coordinate functions. Calculations by Simpson's rule indicate that using six coordinate functions will yield a sufficiently close approximation. E.A.K.

N84-26922# Joint Publications Research Service, Arlington, Va.
INTERACTION OF AIR SHOCK WAVES AND POROUS SHIELD Abstract Only **c02**
B. Ye. Gelfand, A. V. Gubanov, and Ye. I. Timofeyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1983 p 27-28 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 79-84 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The propagation of nonsteady shock waves through porous solid media such as foam and on interaction at the foam-air or air-foam interphase boundary was investigated. Two grades of foam polyurethane, low density with large cells and high-density with small cells were tested. An air shock tube with 30x45 mm 2 rectangular cross section consisting of a 0.5 m long high pressure compartment and a 1.8 m long low pressure compartment separated by a membrane was tested. Stiff piezoelectric pressure transducers and oscilloscopes were used for measurement. The data were evaluated by the Rudinger model, which represents a two phase medium as a pseudogas with equivalent adiabatic exponent and acoustic velocity. The dependence of the pressure field, is revealed which indicates the pattern of wave reflection and refraction with the attendant energy transfer, on the structural characteristics of the porous medium: cell size and acoustic impedance relative to that of a continuous solid medium. E.A.K.

N84-26923# Joint Publications Research Service, Arlington, Va.
AERODYNAMICS OF HOVERING Abstract Only **c02**
A. A. Zaytsev and L. V. Sharina *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1983 p 28 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 71-78 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Hovering aerodynamics based on a three dimensional model of nonsteady flow past a pair of flapping wings in motionless air were analyzed. The house fly, whose flight characteristics and wing parameters are known was taken as an example. The kinetic model is supplemented with the theory of a supporting surface,

with such a surface and the companion vortex sheet each described in a system of its two Lagrangian coordinates. The system of equations was solved numerically, with the flow function approximated by a bicubic spline in Lagrangian variables at discrete instants of time. The effects of kinematic factors on the wing aerodynamics are shown and it is indicated and the needed wing parameters are indicated to ensure an adequate supporting force at a given flapping frequency. E.A.K.

N84-26924# Joint Publications Research Service, Arlington, Va.
ASYMPTOTIC THEORY OF SEPARATION FLOW Abstract Only **c34**
Viktor V. Sychev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 28-29 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 47-54 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Separation flow at a body surface was analyzed by the asymptotic method according to the theory of a turbulent boundary layer. The velocity field in the region around the separation point was determined for an ideal fluid with free streamlines and assumes that the Reynolds number approaches infinity, with the pressure gradient along the surface and the curvature of a streamline described by known asymptotic expansions. The two dimensional Reynolds equation of a boundary layer are formulated in a system of Cartesian coordinates with the origin at the separation point and its two axes respectively on and normal to the plane surface. The region of the stream is divided into five sublayers, two converging to and terminating at the separation point and three continuing beyond. Backstreams appear within a thin laminar sublayer behind the separation point. The velocity profiles in the sublayers are calculated from the corresponding systems of equations, those for turbulent sublayers requiring closure with a model of turbulence and use of the Heaviside function at the separation point, and with the solutions appropriately collocated. The turbulence model is based on the Prandtl mixing path hypothesis and a recurrence relation for the coefficients. E.A.K.

N84-26925# Joint Publications Research Service, Arlington, Va.
EFFECT OF INJECTION INTO BOUNDARY LAYER ON FLOW OF SUPERSONIC STREAM PAST OSCILLATING CONE Abstract Only **c02**
Ye. S. Korniyenko and V. N. Shmanenikov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 29 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 43-46 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Interaction of a stream of ideal gas and a boundary layer for a supersonic stream and an acute cone oscillating about its zero angle of attack position were analyzed. The equations of a nonviscous gas were solved and a zero thickness of the boundary layer was assumed. The equations of a boundary layer are solved for the normal component of velocity at the outer edge of the laminar sublayer, whereupon the equations of an ideal gas are solved with the injection velocity at that edge set equal to that normal component. The cone is referred to as a Cartesian system of coordinates whose one axis coincides with the cone axis and to a spherical system of coordinates with the origin at the cone vertex. The equations of motion for a gas through the boundary layer at the surface of a cone oscillating with small amplitude are written in Blasium variables and the equations of state are solved by separation of variables with each sought function expressed in the form of a power series in the Struhal number. The effect of gas injection on the damping of cone oscillations is evaluated for heating and sublimation of the cone material by a nonsteady thermal flux. It is indicated that a boundary layer decreases the damping when the injection rate is low, but increases it more than in the case of a nonviscous gas when the injection rate becomes sufficiently high. E.A.K.

N84-26926# Joint Publications Research Service, Arlington, Va.
EFFECT OF NONHOMOGENEITY ON NONLINEAR STABILIZATION OF ACOUSTIC VIBRATIONS IN HEAT EMITTING MEDIUM WITHIN BOUNDED VOLUME Abstract Only **c71**
A. P. Vorobyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 30 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 3-8 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The acoustic stability of a heat emitting gas was analyzed based on the equations of gas dynamics under conditions of thermodynamic equilibrium while the thermal radiation flux is described according to diffusion theory. The steady state intensity of heat release and coefficient of radiative heat transmission and the coefficient of heat transfer through the lateral channel wall and temperature of the latter are negligible in comparison with attenuation of thermal radiation. It is assumed that the latter remains uniform. The gas is stationary in the steady state, with heat transfer through the lateral channel wall which occurs in accordance with Newton's law and longitudinally by conduction. The conservative problem is considered with a longitudinal density gradient. The corresponding boundary value problem generates a system of eigenfunctions and eigenvalues, with eigenfunctions corresponding to different eigenvalues being orthogonal. The nonlinear problem is solved by the variation of arbitrary consists method with the conservative part expanded into eigenfunctions. A specific numerical example is a gas with small sinusoidal nonhomogeneity and a steady state temperature peaking at the channel center section. E.A.K.

N84-26927# Joint Publications Research Service, Arlington, Va.
VORTICAL-POTENTIAL FLOW OF IDEAL FLUID ALONG PLANE WITH DEPRESSION Abstract Only **c34**
V. S. Sadovskiy and N. P. Sinitsyna *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 30-31 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 161-163 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The problem of flow of an ideal incompressible fluid along a plane is solved exactly for the case of an unbounded stream passing over a transverse semicylindrical depression along the path. The flow is assumed to be potential above the plane and the depression but vortical inside the depression. At the separation line a positive jump of the Bernoulli constant occurs its magnitude is obtainable from the condition of continuity and the Bernoulli integral, while the vortical potential flow satisfies the Prandtl-Batchelor condition. The boundary value problem for the corresponding two dimensional Laplace equation is solved by conformal mapping and subsequent reduction to two nonlinear integral equations in two unknown functions of one coordinate. The solution becomes more intricate in the case of asymmetric flow. The algorithm has been programed for a BESM-6 high speed computer. E.A.K.

N84-26928# Joint Publications Research Service, Arlington, Va.
SUPERSONIC THREE-DIMENSIONAL JET FLOW IN CHANNEL Abstract Only **c02**
A. V. Antsupov and A. V. Shuynov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 31 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 155-159 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Supersonic three dimensional flow in a cylindrical channel upon jet discharge from an asymmetrically oriented nozzle was studied. The distributions of pressure and lateral force on the channel wall, as functions of the ratio of static pressure in nozzle to static pressure in channel over the 0.5 to 7.0 range and of the ratio of channel radius to nozzle radius over the 1.5 to 3.0 range were analyzed. Experiments were performed inside a continuously duty pressure chamber. Calculations were performed according to the

steady analog method. Attached flow in a channel, assuming an ideal was calculated. It is indicated that the numerical analysis yields an accurate complete flow pattern. The effect of nozzle translation and nozzle rotation was studied. It is found that forward displacement of the nozzle sharply increases the pressure peaks and almost linearly increase the lateral force. Rotation of the nozzle does not increase the pressure peaks appreciably and does not cause oscillatory change in the lateral force. E.A.K.

N84-26929# Joint Publications Research Service, Arlington, Va.
SEPARATION FLOW OF TRANSSONIC WATER STREAM PAST CIRCULAR CONE Abstract Only **c02**
G. A. Alyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 32 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 152-154 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Axisymmetric flow of water at constant velocity V past a circular cone of finite length is analyzed in the range of water pressures not exceeding 2940 MPa, where its static and dynamic adiabats remain almost identical and can be described by the Tate equation. The corresponding system of equations of continuity and motion, in matrix form, is closed by the steady state Bernoulli equation. Solution of this system by numerical integration according to a two dimensional straight through difference scheme was programmed in ALGOL-60 for a BESM-6 high-speed computer. The frontal drag coefficient as a function of the Mach number was calculated. The results differ from those based on the linear theory as the vortex angle becomes wider. The distribution of the pressure coefficient along the cone surface was calculated with a 30 x 30 grid. All flow parameters become uniform over the cone surface upon disappearance of a transonic flow region behind the density jump. E.A.K.

N84-26930# Joint Publications Research Service, Arlington, Va.
IMMERSION OF DISK IN COMPRESSIBLE FLUID AT ANGLE TO FREE SURFACE Abstract Only **c34**
V. A. Yeroshin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 32-33 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 142-144 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Fast immersion of a disk in a compressible fluid was considered in the oblique mode. The dependence of the maximum impact drag coefficient and of the length of the transient period of impact load buildup on the Mach number of the disk prior to impact is established. The conventional expression for the maximum impact drag coefficient for immersion in an incompressible fluid such as water is modified to account for the compressibility of the fluid and remove the singularity Cx max infinity as the difference between angle of disk trajectory theta and angle of attack alpha approaches 90 deg. E.A.K.

N84-26931# Joint Publications Research Service, Arlington, Va.
MAGNETOHYDRODYNAMIC FLOW PAST NONCONDUCTING WEDGE Abstract Only **c75**
Ye. A. Pushkar *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1983 p 33 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 102-112 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The problem of magnetohydrodynamic (MHD) flow past a nonconducting wedge facing the stream at an arbitrary angle of attack is solved by a numerical method for the case of plane polarization with the magnetic field not parallel to the velocity vector. Only a weak solution, corresponding to slow shock waves, is sought with three dimensionless parameters. Four boundary conditions are established, zero normal velocity component at each wedge face and equal magnetic field intensity components at both wedge faces, this number of conditions is equal to the number of unknowns and the problem is well conditioned. The solution is plotted in the theta 1, theta 2 plane of wedge angles. The results are useful in the study of processes in MHD machines which include plasma accelerators, quasisteady astrophysical processes, and the Earth's magnetosphere. E.A.K.

N84-26932# Joint Publications Research Service, Arlington, Va.
REGULAR REFLECTION OF STRONG SHOCK WAVE BY WEDGE SURFACE Abstract Only **c34**
V. I. Bogatko and G. A. Kolton *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 34 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 92-96 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The problem of reflection of a strong shock wave by a wedge surface is solved analytically by the method of perturbations, a version resembling the method of a small parameter. A strong plane shock wave propagating through a stationary gaseous medium strikes an inclined plane. The boundary conditions for the corresponding system of vector equations describing the flow of gas and equations of the acoustic lines are impermeability of the surface and dynamic compatibility at the wave front after reflection. This boundary-value problem is simplified by the assumption that a shock wave traveling at a high velocity in a gas with the ratio of specific heats not much higher than unity remains close to the inclined plane after reflection. In this approximation, with the acoustic lines becoming circles, the solution yields the trajectory of the reflected wave through two vortex-free regions separated by a vortex region between two critical points, all trajectories of particles being rectilinear and passing through the center of acoustic circles. B.W.

N84-26933# Joint Publications Research Service, Arlington, Va.
SEPARATION FLOW AT CONCAVE CONICAL WINGS Abstract Only **c02**
V. V. Kravets and A. I. Shvets *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 34-35 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 83-91 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An experimental study of flow at conically concave delta wings was made, a particular concern being the pressure distribution and the lift force. Two sets of wing models with fixed sweepback angles, 73 deg (three models) and 78.7 deg (two models) respectively, were tested at a Mach number M = 3 in the supersonic wind tunnel at the Institute of Mechanics (Moscos State University). The angle of attack was varied from 0 to 15 deg. Taper and width of the concavity were defined by angles 17 deg, 17.5 deg, 18.5 deg, 11.3 deg, 11.7 deg and 90 deg, 102.5 deg, 113.5 deg, 90 deg, 108.5 deg. For control, a flat delta wing (taper angle 0 deg, width angle 180 deg) was added to each set. Pressure was measured with an inductive transducer through a pneumatic commutator switch, with an rms relative error of + or - 3%.The data reveal a positive pressure jump across the cavity, except in the vicinity of the leading edges. They also reveal a drop of total pressure in the wake behind wings with zero angle-of-attack orientation. The results are interpreted in terms of interaction of the density jump and the boundary layer near the edges, with attendant separation, and interaction of viscous and nonviscous streams outside the pressure jump. B.W.

N84-26934# Joint Publications Research Service, Arlington, Va.
PASSAGE OF WAVES IN FLUIDS THROUGH DAMPING INTERLAYERS AND THEIR INTERACTION WITH BARRIER Abstract Only **c34**
A. G. Lyakhov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 35 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 53-58 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Interaction of a wave in a liquid-gas mixture with a barrier after passage through a porous solid medium is analyzed, taking into account the relaxation mechanism. A momentary compression of the liquid is assumed to occur under load, while the pressure in air bubbles is assumed to change adiabatically and deformation of air bubbles can be described by the viscous term in the Rayleigh-Lamb equation alone. The corresponding two equations of change of state, through deformation and relaxation respectively, together with the Euler equation and the equation of continuity in Lagrange variables constitute a closed system of equations which is solvable by the method of characteristics. Pressure transients have been calculated by this method for three forms of pressure wave (step of finite duration, step of finite duration, descending ramp of finite duration) in glycerin with air bubbles passing through a 3 mm thick porous damper before reaching an immovable solid barrier to which the damper adheres. The damper effectiveness, characterized by amper action time which shortens the wave barrier interaction time, is found to be approximately proportional to the volume fraction of air in the liquid within the 0.02-0.4 range and also approximately proportional to the thickness of the damping layer. Author

N84-26935# Joint Publications Research Service, Arlington, Va.
EFFECT OF ACOUSTIC PERTURBATIONS ON FLOW STRUCTURE IN BOUNDARY LAYER WITH UNFAVORABLE PRESSURE GRADIENT Abstract Only **c34**
A. V. Dovgal and V. V. Kozlov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 36 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 48-52 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An experimental study was made concerning the effect of an acoustic field on the flow in a laminar boundary layer with an unfavorable pressure gradient. A boundary layer with a longitudinal pressure gradient was realized on a foil facing the air stream at a zero angle of attack along the channel axis. A dynamic loud-speaker in the diffuser emitted sound waves in the upstream direction, thus exciting acoustic velocity and pressure perturbations. The frequency of sound was varied over the 30-250 Hz range in 4 Hz bands and the sound pressure within the test zone was maintained within 90-105 dB or 20-30 dB above the integral-spectral ambient noise pressure, at a stream velocity V infinity = 5.7 m/s. Both average and fluctuation velocity profiles were measured with a constant-temperature hot-wire anemometer. The results reveal accordingly that two-dimensional eddy fluctuations, occurring at the acoustic frequency, become appreciable farther downstream where the pressure gradient becomes unfavorable and acoustic perturbations transform into Tollmin-Schlichting waves within the instability frequency range. B.W.

N84-26936# Joint Publications Research Service, Arlington, Va.
THREE-DIMENSIONAL TURBULENT BOUNDARY LAYERS AT BIELLIPTICAL BODIES IN STREAM OF COMPRESSIBLE GAS AT SOME ANGLE OF ATTACK Abstract Only **c34**
V. A. Aleksin and Yu. D. Shevelev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 36-37 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 39-47 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Three-differential turbulent boundary layers at conical bodies with biellipticai cross section in a stream of compressible gas are analyzed on the basis of a system of partial differential equations in a curvilinear system of coordinates. These equations, one equation of continuity and two equations of momentum, contain geometrical coefficients and semiempirical effective transfer coefficients. The semiempirical model of transfer is a direct extension of a two-dimensional model of turbulent transfer with fast changes in boundary conditions. The effective dynamic viscosity depends on the local Reynolds number and the local critical Reynolds number, the effective thermal conductivity depends on the two Reynolds numbers as well as on the local Prandtl number and the local eddy Prandtl number. The partial differential equations have been integrated numerically by the method of finite differences, with fourth-order accuracy in the normal coordinate. Pressure and velocity fields, including the separation zone and points of maximum thermal flux and maximum friction on the surface, have been determined in this way for a biellipticai conical body at angle of attack alpha = 20 deg in a supersonic air stream with M infinity = 20. B.W.

N84-26937# Joint Publications Research Service, Arlington, Va.
INTERACTION OF TURBULENT BOUNDARY LAYER AND UPWARD DENSITY JUMP AT TRANSSONIC STREAM VELOCITIES Abstract Only **c02**
S. A. Velichko and Yu. B. Lifshits *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 37 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 32-38 (For primary document see N84-26895 17-32)
Avail: NTIS HC A04/MF A01

Interaction of a turbulent boundary layer at a plate and an upward density jump in a transonic stream is analyzed by the asymptotic method, assuming a power-law rather than logarithmic profile of average velocity in the unperturbed boundary layer. The flow beyond the boundary layer is assumed to be laminar, implying that all correlation coefficients for the sought quantities (longitudinal and normal velocity components, density, pressure, temperature) are zero. Estimates are established, orders of magnitude, for increments of velocity components and pressure as a result of interaction at a Mach number M infinity such that M(2) 1 = epsilon << 1 and a relative thickness of the laminar sublayer delta = t/L << 1. On this basis, with velocity components as well as pressure and density each sought in the form of a power series in the small parameter epsilon, the corresponding Navier-Stokes equations are solved for each of the three characteristic subregions of a boundary layer under a density jump of given intensity. The solution to second-order partial differential equations, obtained numerically with a conservative analog of relaxation, yields results which differ from those based on a logarithmic initial velocity profile but come close to experimental results with the largest discrepancy (3.5%) in pressure. Author

N84-26938# Joint Publications Research Service, Arlington, Va.
TURBULENT BOUNDARY LAYER AT PLATE WITH SUCTION AT VARIOUS ANGLES Abstract Only **c34**
Ye. V. Dunayeva, V. M. Yeroshenko, A. A. Klimov, and V. I. Kondratyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 38 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 27-31 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An experimental study of turbulent boundary layers at porous or perforated plates with suction was made, for the purpose of determining the dependence of average and fluctuation velocity profiles on the angle between the direction of suction and the direction of the stream parallel to the plate. The purpose was to supplement already available data pertaining to low suction rates and nongradiental flow with data covering a wide range of suction rates (V sub w/V sub o = 0.002-0.047, V sub w- normal component of velocity at wall, V sub o - velocity of stream beyond boundary layer), negative and positive pressure gradients (with k = (nu/rho) V(3) (DP/DX) ranging from -2.2.10 to the minus 6 power to 4.8.10 to the minus 6 power, nu- kinematic viscosity, rho- density, P- pressure, X- longitudinal coordinate). Measurements were made at a Reynolds N sub R = 2.10 to the 5th power with suction angles alpha = 20 deg, 90 deg, and 160 deg relative to the direction of the stream. The velocity profiles were found to be flattest at alpha = 90 deg and most distorted at alpha = 20 deg (against the stream). Further evaluation of the data has yielded the momentum thickness delta ** of the boundary layer and the ratio of its displacement thickness to momentum thickness delta*/delta** (form factor), also the skin-friction coefficient Cf, as functions of the suction parameter b sub zero = 2F/Cf sub

zero (F = V sub w/V sub o, Cf sub zero friction coefficient in absence of suction). Author

N84-26939# Joint Publications Research Service, Arlington, Va.
TURBULENT FLOW OF AEROSOL IN ROTATING CHANNELS OF TURBOMACHINES Abstract Only **c34**
G. G. Medvedev, M. V. Vasilevskiy, V. N. Kurochkin, and Zh. A. Anisimov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 39 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Energ. i Transport (Moscow), no. 5, May 1983 p 95-100 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Rotary separators are used for removal of suspended solid particles from the gas stream in rotating channels of a turbomachine. The aerosol is first precipitated and coagulated on the channel surfaces by action of centrifugal and Coriolis forces, then driven to the periphery of the runner for subsequent extraction. The effectiveness of this process in long narrow rotating channels depends on the turbulence of flow. For an evaluation of the separator performance, the turbulent flow of an aerosol in backward slanted rather than radial channels is described by the equation of a cyclon, analogus to that for centrifugal dust trap, with the appropriate boundary conditions. Attenuation of external turbulence along a channel and turbulent diffusion are accounted for by corresponding mass transfer coefficients, the latter determined from the condition of continuity for the gas and the momentum equation in accordance with the semiempirical theory. An expression is obtained for the efficiency of such a separator on this basis and another one is obtained from the equation of trajectories without turbulence, both involving geometrical parameters of the system and thus useful for design purposes. B.W.

N84-26940# Joint Publications Research Service, Arlington, Va.
VIBRATIONS OF AND RADIATION FROM SHELL OF REVOLUTION UNDER HOOP LOAD Abstract Only **c39**
D. G. Vasilyev and A. L. Goldenveyzer *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 40 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 184-193 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A closed shell of revolution with a meridian of arbitrary form is immersed in a compressible fluid, whereupon forces and moments harmonically varying in time are applied to it around a parallel. The resulting forced vibrations and radiated waves in the shell-fluid system are calculated from the equations of motion for the shell and the wave equation for the fluid as well as the condition of impermeability, with use of zero-moment differential operators and a moment differential operator in the theory of shells. The order of force, moment, and displacement harmonic is an additional parameter. The problem is first solved by integration of the homogeneous system of equations over the half-spaces on each side of the loaded parallel and subsequent collocation at that parallel with the proper discontinuities. The problem is also solved by an iterative asymptotic method which facilitates collocation on the shell surface as well as in the fluid. This is possible, because a normal hoop force or moment acting beyond the immediate vicinity of the shell produces, in the zeroth approximation, a pressure field which a force or moment acting directly on the fluid would produce. B.W.

N84-26941# Joint Publications Research Service, Arlington, Va.
EVALUATION OF ENERGY CHARACTERISTICS OF BIPEDAL WALKING AND RUNNING BY MODEL ANALYSIS Abstract Only **c54**
V. V. Veletskiy and Yu. V. Bolotin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 41 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 89-94 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The energy characteristics of bipedal motion on a horizontal ground are evaluated with the aid of the mathematical apparatus for analyzing the dynamics of a free material point, in this case the center of mass. The equations of its motion are formulated differently for running and for walking. In the case of running the duration of contact between foot and ground is assumed to be so short as to make the flight duration almost identical to the step duration. In the case of walking, with the object assumed to be resting on one leg at every instant of time, two modes are considered. The first mode of walking is with the center of mass moving as a pendulum. The second mode of walking is with the center of mass remaining at a constant given altitude above ground. The relations for energy consumption per unit distance or per unit time, respectively, indicate ways to optimize the motion for maximum economy in each case, the variable parameter being the length of step. After first disregarding the dynamics of leg transfer in the first approximation, the analysis continues with the dynamics taken into account and then with impact effects also corrected for. Numerical data are given and their accuracy is estimated. B.W.

N84-26942# Joint Publications Research Service, Arlington, Va.
TREATMENT OF WALKING AS CONTROLLABLE SELF-EXCITED OSCILLATIONS Abstract Only **c54**
Yu. I. Neymark *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 41-42 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 81-88 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Walking is treated as controllable oscillatory motion of a bipedal mechanism. Each cycle is subdivided into two phases, first one leg swinging over with other leg as pivot and then switching of legs, each leg being simulated by a two-bar kinematic linkage. This motion is analyzed in the Lagrangian formalism, with the jerk of the pivot leg prior to switching regarded as both self-excitation and means of speed control. The objects of control are angular displacement and velocity of the swinging leg, running being excluded from consideration on account of its being a different process with three phases per cycle, also pace stabilization and smoothness. The ground is assumed to be hard, a soft ground constituting an extreme case without jerking. Author

N84-26943# Joint Publications Research Service, Arlington, Va.
SUBHARMONIC VIBRATIONS OF ROTOR MOUNTED IN ROLLING BEARINGS Abstract Only **c39**
A. V. Movchan and V. V. Filatov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 42 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 77-80 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An experimental study of subharmonic vibrations of a rotor was made, with a gyromotor mounted in ball bearings so as to ensure very low friction. The electric gyromotor was a 3-phase synchronous one with voltage and frequency control. The rotor speed was measured with a stroboscopic tachometer for precise speed control and recording, its vibrations were measured by means of a piezoelectric accelerometer with the sensitivity axis in the radial plane of one bearing. The accelerometer readings, twice integrated and amplified, were fed to a digital computer for harmonic analysis. Each of the five such GMS-9 motors for this experiment was mounted in 1000095 ball bearings with stationary inner race and rptating outer race. The vibration spectra of all motors reveal two dominant frequencies, indicated by sharp amplitude peaks. These frequencies correspond respectively to the speed of the rotor w and to the speed of the bearing separator w sub s, the ratio of these speeds remaining w sub s/w = D/(D + d) = 0.61 in all tests (D and d diameters of outer and inner bearing race, respectively, at the contact line in the groove). Author

N84-26944# Joint Publications Research Service, Arlington, Va.
STABILITY OF STEADY MOTION OF PLANAR BODY IN FIELD OF CENTRAL FORCE Abstract Only **c70**
V. F. Zhuravlev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 42-43 Transl. into ENGLISH

from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 83 p 71-76 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A problem of a planar body moving in its plane is considered, namely attraction of such a body to a stationary point O outside by a force applied to it at a point O other than its center of mass G. The plane motion of this body is analyzed, with the fixed distance (eccentricity) e = absolute value of OG as parameter. The force f(r) is assumed to be a potential one, a function of the variable distance r = absolute value of OO. The corresponding equations of motion are first put in the Langrangian form and the family of steady-state solutions is obtained, whereupon the amplitude-frequency characteristic and the stability region are established for a not necessarily linearly elastic body. As a special case is considered a convex from below force. The stability of motion is further analyzed in the Hamiltonian formulation, after an appropriate change of generalized coordinates. The roots of the characteristic equation are tested for real parts and stability criteria are established on the basis of Lyapunov's first theorem or the Arnold-Moser theorem wherever applicable. Zero eccentricity is also considered as a special case. Author

N84-26945# Joint Publications Research Service, Arlington, Va.
STABILITY OF PERIODIC OSCILLATIONS OF ALMOST AXISYMMETRIC SATELLITE IN PLANE OF ELLIPTICAL ORBIT Abstract Only **c13**
A. L. Petrov, V. V. Sazonov, and V. A. Sarychev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 43 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 41-50 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

A solid satellite of almost axisymmetric form, but with an anomaly of its center of mass as independent variable, is considered moving in an elliptical Kepler orbit. Its periodic oscillations in the plane of that orbit, caused by the gravitational torque, are analyzed for stability. The corresponding system of equations of motion has the property that, if its solution satisfies the condition of plane motion at some initial anomaly of its center of mass, it will satisfy this condition at very other magnitude of the anomaly. The 2 pi - periodic solution to the corresponding boundary-value problem has been obtained by numerical methods. The stability region is established analytically as that for two independent linear systems, the two variational equations describing them reduced to an equivalent single one. After the dependence of the coefficients in the characteristic equation on e and mu (e- eccentricity of the ellipse, mu = 3(C - A)/B, A,B,C moments of inertia with respect to the central principle axes x,y,z) has been determined, existence and uniqueness of the 2 pi - periodic solution are proved on the basis of Poincare's theorem.
B.W.

N84-26946# Joint Publications Research Service, Arlington, Va.
INTEGRABLE EQUATIONS OF MOTION BY INERTIA FOR TWO BODIES COUPLED THROUGH SPHERICAL HINGE Abstract Only **c70**
M. Ye. Lesina and P. V. Kharlamov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 44 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 26-31 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The motion by inertia of a housing and a flywheel coupled through and ideal spherical hinge is considered. This two body system is assumed to be conservative. One class of solutions was obtained for the case of zero momentum, with the energy integral splitting into three invariant equalities. Another class of solutions was obtained for the case of a nonzero momentum vector which remains constant in space but varies in the two bases. The six differential equations in the system of six differential and six algebraic ones were also integrable. R.S.F.

N84-26947# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL STUDY OF BEHAVIOR OF CYLINDRICAL SHELLS WITH LUMPED MASSES UNDER DYNAMIC EXTERNAL PRESSURE Abstract Only **c39**
L. V. Andreyev, A. V. Antsiferov, O. M. Dubovik, and I. D. Pavlenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 44-45 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 187-191 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

Circular cylindrical shells, smooth and with attached discrete masses, were examined under pulses of uniformly distributed external pressure. The shells, constructed of chromium-nickel sheet steel, were dynamically loaded with electromagnetic and electrohydraulic devices to produce axisymmetric flexural vibrations of various durations. Steel balls of different sizes were welded onto the shells; whereupon the shells were tested again for stability loss under vibratory loading. Results suggest that the critical loading point is lower for a shell with attached massess than for a smooth shell. R.S.F.

N84-26948# Joint Publications Research Service, Arlington, Va.
EFFECT OF PRESSURE WAVE ON CYLINDRICAL SANDWICH SHELL IMMERSED IN COMPRESSIBLE FLUID Abstract Only **c39**
V. I. Pozhuyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 45 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 157-165 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

An axisymmetric pressure wave propagates at constant velocity along the inside surface of a cylindrical sandwich shell of infinite length immersed in an ideal compressible fluid. The steady-state response of that shell in terms of displacement and stress was calculated from the partial differential equations of motion for both sheaths, the vector equation of motion for the filler between them, and the wave equation for the fluid. Specific solutions were obtained for subseismic (pressure wave slower than shear wave in filler) and superseismic (pressure wave faster than tension-compression wave in filler) as well as intermediate transseismic (pressure wave faster than shear wave but slower than tension-compression wave) cases with either rigid or sliding contact between sheaths and filler. Special cases were double-layer shells without inner sheath or without outer sheath respectively and a shell without both sheaths (filler alone of thick-wall single-layer shell) under propagating internal pressure. Numerical results were obtained for shells with steel sheaths and hard or soft (polyvinyl chloride) filler in water. R.S.F.

N84-26949# Joint Publications Research Service, Arlington, Va.
EFFECT OF ELASTICALLY SUSPENDED MASSES ON STABILITY OF ELASTIC PANELS IN SUPERSONIC STREAM Abstract Only **c02**
V. V. Bolotin and B. P. Simonov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 46 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 149-156 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The aerodynamic problem of stability was solved for a horizontal plane panel mounted into a perfectly rigid and infinitely large frame. Its top surface was swept by a supersonic stream occupying the upper half-space and flowing at an unperturbed velocity parallel to that surface. The panel was treated as a thin elastic plate deformable according to Kirchhoff's theory. Viscoelastic bodies were suspended from the panel in the lower half space at discrete points. The equation of vibrations for the panel was supplemented with one equation of motion for a suspended point-mass or with two equations of motion for a suspended line-mass. Integration of the flow function yielded the aerodynamic lift and drag coefficients. The linearized Cauchy-Lagrange integral yielded the perturbed pressure. Approximations of quasi-steady motion and

steady motion were checked at moderate velocities of supersonic air flow and moderate frequencies of panel vibration. An analysis of panel stability on the basis of those equations and their solution revealed the effect of suspended masses. R.S.F.

N84-26950# Joint Publications Research Service, Arlington, Va.
THREE-DIMENSIONAL STRESSED STATE OF LONGITUDINALLY CORRUGATED ELASTIC CYLINDERS Abstract Only c39

Yu. N. Nemish and D. I. Chernopiskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 46-47 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 55-62 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The three-dimensional stressed state of an elastic, hollow, basically circular, cylinder with longitudinal corrugation of both surfaces was calculated. The inside radius and the outside radius were assumed to vary with equal amplitudes as the same continuous differentiable function of the circumferential coordinate. Eight possible variants of such corrugation were considered, two cophasal and two antiphasal combinations, including the special cases of either a smooth inside surface or a smooth outside surface. The form of the lateral surfaces and the end constraints were assumed to admit Taylor expansion of displacements and stresses in the vicinity of a surface. A single notation with differential operators was used to describe the boundary conditions in every order of approximation. The solution of the corresponding boundary-value problem involved evaluating Bessel functions and MacDonald functions of an imaginary argument. Numerical results were obtained by the method of boundary shape perturbation. R.S.F.

N84-26951# Joint Publications Research Service, Arlington, Va.
ELASTOPLASTIC DOUBLE-WALL SHELLS UNDER INTRICATE NONISOTHERMAL LOAD Abstract Only c39

B. Ye. Sivchikov and I. N. Sokolova *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 47 Transl. into ENGLISH from Probl. Prochnosti (Kiev), no. 7, Jul. 1983 p 106-109 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The stressed and strained state of an elastoplastic axisymmetric thin double-wall shell under an intricately varying nonisothermal load was calculated. The walls were assumed to be either rigidly clamped or freely supported, but each differently heated. The theory of plastic deformation and a simple piece-wise-linear variant of the Trask-St. Venant model were used for analysis. The corresponding boundary-value problem was solved for a shell with variable-thickness (tapering) outer wall made of a titanium alloy and uniform-thickness inner wall made of a bronze alloy. Three different loading programs were considered. The attendant plastic elongation-contraction cycles in boith principal directions, axial and circumferential, were determined in each case. R.S.F.

N84-26952# Joint Publications Research Service, Arlington, Va.
STRESSED AND STRAINED STATE OF CYLINDRICAL SHELLS REINFORCED WITH HOOPS Abstract Only c39

A. P. Tatarinov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 48 Transl. into ENGLISH from Probl. Prochnosti (Kiev), no. 7, Jul. 1983 p 102-106 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The problem of reinforcing a cylindrical shell for static strength with elastic stiffner hoops is considered on the basis of the corresponding discrete-continual model. The model assumes the hoops to be closely spaced. The total state of stress was resolved into a principal zero-moment component and an additional nonzero-moment one. The system of six homogeneous equations for the zero-moment shell with internal forces was integrated. The solution of the resolvent equation for edge effect was expressed in terms of Krylov functions. Conditions of coupling between the hoops and sheath were established, taking into account compatibility with respect to strains and kinematic factors. The system of four differential equations of equilibrium for a hoop was reduced to a system of eight algebraic equations for each Fourier component, conveniently expressible in matrix form. A numerical solution was obtained on a YeS-1033 Unified System computer for the design of an MK-3.25x4 sheave of a hoisting machine with four ropes. R.S.F.

N84-26953# Joint Publications Research Service, Arlington, Va.
RESIDUAL STRESSES IN LONG DOUBLE-LAYER CYLINDER UNDER NONSTEADY COOLING Abstract Only c39

V. Ya. Belousov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 48 Transl. into ENGLISH from Probl. Prochnosti (Kiev), no. 7, Jul. 1983 p 98-101 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The problem of residual stresses in a solid double-layer nonhomogeneous circular cylinder was examined for the case wherein the temperature is a function of both the radial distance from the axis and of time. The materials of the cylinder were assumed to be ideally elastoplastic of the Trask kind, the temperature dependence of their mechanical and thermophysical properties is disregarded, and the mechanical contact between lawyers is assumed to be ideal. The cylinder was cooled from a uniform initial temperature to a constant ambient temperature. Strains and displacements were calculated from the corresponding equations for the case of an axial stress lower than the tangential stress, but higher than the radial stress. The transition between elastic and plastic deformation was established in terms of critical temperature difference between cylinder surface and ambient medium, as well as corresponding maximum quasi-static stresses. R.S.F.

N84-26954# Joint Publications Research Service, Arlington, Va.
ORIENTATION AND CALIBRATION OF THREE-DIMENSIONAL TACHOMETER WITH AID OF AVAILABLE ANGLE DATA Abstract Only c35

A. I. Tkachenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 49 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 19-23 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

The problem of determining the spatial orientation of an 'instrument' trihedron was investigated. An trihedron with its angular velocity measured continuously and its initial orientation known approximately was considered. The readings of angular velocity were assumed to contain a small additive error representable as a linear combination of a finite number of known functions with unknown coefficients, the latter to be determined along with the parameters defining the orientation of the instrument. The components of the true velocity vector were assumed to be continuously differentiable of the true velocity vector were assumed to be continuously differentiable with respect to time throughout almost the entire measuring period. This problem was solved with the aid of available data on the angular motion of another trihedron with fixed but unknown orientation relative to the instrument. The solution was analyzed for accuracy, and a procedure for refining the orientation of the orthonormalized instrument vector basis was demonstrated. R.S.F.

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N84-26955 Academy of Sciences of the Ukrainian SSR, Kharkov (USSR). Inst. of Radiophysics and Electronics.
THE TIME-SPATIAL STRUCTURE OF MICROWAVE RADIO FIELDS ON LINE-OF-SIGHT OVERWATER PATHS

A. S. Bryukhovetsky, V. A. Kabanov, V. B. Sinitsky, V. M. Tigrov, I. S. Tourgenev, and S. I. Khomenko 1983 39 p refs In RUSSIAN; ENGLISH summary
(Rept-220) Copyright. Avail: Issuing Activity

The result of experimental and theoretical investigations of the time-spatial field pattern are discussed for radio wave ranges 35.4 and 0.8cm. The measurements carried out on overwater paths 7 and 22 km long were accompanied by monitoring vertical profiles of the refraction index, up to heights about 100m over the sea surface, performed with standard meteorological sensors and a microwave refractometer. The theoretical calculations were carried out in terms of ray optics, for different models of the refractive index profile. The distribution of the effective gradient as obtained from the radio physical experiments during the summer and autumn periods, is close to the normal law, with median value corresponding to the critical refraction. Author

N84-26956# Arinc Research Corp., Annapolis, Md.
UNIT PRODUCTION COST OF THE RADAR BEACON TRANSPONDER (RBX) Final Report, 3 Mar. - 30 Oct. 1981
A. Schust, W. Lovelace, and K. Peter Oct. 1982 78 p refs
(Contract DOT-FA76WA-3788)
(AD-A121532; FAA-RD-82-18; Rept-1326-01-1-2824) Avail: NTIS HC A05/MF A01

On the basis of circuit and equipment designs, the unit factory selling cost of the RBX was determined to be $53,190. Equipment costs derived using the cost estimating method are listed for the various components. All costs are based on 1981 dollars without inflation. A modular transmitter that uses four 1,150-watt amplifier modules was designed. With the appropriate number of amplifier modules, the estimated costs of a 1 kW transmitter and a 2 kW transmitter were $9,580 and $17,530, respectively. On the basis of these costs, an RBX with a 1 kW transmitter would be approximately $33,130; and RBX with a 2 kW transmitter would cost approximately $41,080. However, an RBX with a 1 kW or 2 kW transmitter might be completely different. A.R.H.

N84-26957# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ANALYSIS OF HOUSEKEEPING RADIOLINKS SATELLITE/GROUND STATION [ANALISE DE RADIOENLACES DE SERVICO SATELITE/ESTACAO TERRENA]
Etiene M. Schneider May 1984 34 p refs In PORTUGUESE; ENGLISH summary
(INPE-3097-NTE/217) Avail: NTIS HC A03/MF A01

The analysis of housekeeping radio links between satellite and ground station is a fundamental item for the ground station design, specially when this station sould support multimission applications. The chief parameters for this kind of analysis are examined, and a method of calculation of these parameters is described. Author

N84-26958# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SYSTEM REQUIREMENTS FOR A SCPC FM LOW CAPACITY EARTH STATION [REQUISITOS DE SISTEMA PARA ESTACAO TERRENA SCPC FM DE BAIXA CAPACIDADE]
Aydano B. Carleial Nov. 1983 12 p In PORTUGUESE; ENGLISH summary
(INPE-2943-NTE/207) Avail: NTIS HC A01/MF A01

The principal technical requirements that must be satisfied by the low-capacity Earth stations being developed for use by the Brazilian Armed Forces are described. The stations are to be used in military communication networks to be set up with the domestic satellite of the Brazilian System of Telecommunication by Satellite (SBTS). Author

N84-26959# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
SPECIFICATIONS FOR A LOW CAPACITY SCPC FM EARTH STATION [ESPECIFICACOES DE ESTACAO TERRENA SCPC FM DE BAIXA CAPACIDADE]
Aydano B. Carleial, Janio Kono, Jose Antonio Rodrigues, Yumiko Arakaki, and Naila Hoelz Colla Nov. 1983 29 p In PORTUGUESE; ENGLISH summary
(INPE-2944-NTE/208) Avail: NTIS HC A03/MF A01

Equipment specifications are delineated for a low-capacity SCPC FM Earth station that is being developed by INPE and manufactured by the national industry for utilization by the Armed Forces. Author

N84-26960*# Texas A&M Univ., College Station. Remote Sensing Center.
DEVELOPMENT OF LAND BASED RADAR POLARIMETER PROCESSOR SYSTEM
C. W. Kronke and A. J. Blanchard Sep. 1983 221 p refs
(Grant NAG5-31)
(NASA-CR-173636; NAS 1.26:173636; PR-RSC-4242-4-2) Avail: NTIS HC A10/MF A01 CSCL 17I

The processing subsystem of a land based radar polarimeter was designed and constructed. This subsystem is labeled the remote data acquisition and distribution system (RDADS). The radar polarimeter, an experimental remote sensor, incorporates the RDADS to control all operations of the sensor. The RDADS uses industrial standard components including an 8-bit microprocessor based single board computer, analog input/output boards, a dynamic random access memory board, and power supplis. A high-speed digital electronics board was specially designed and constructed to control range-gating for the radar. A complete system of software programs was developed to operate the RDADS. The software uses a powerful real time, multi-tasking, executive package as an operating system. The hardware and software used in the RDADS are detailed. Future system improvements are recommended. Author

N84-26961# Selenia S.p.A., Rome (Italy).
RIVISTA TECNICA SELENIA, VOLUME 8, NUMBER 1
1982 40 p refs Original doc. contains color illustrations
Avail: NTIS HC A03/MF A01

The life cycle cost of integrated logistic support; frequency modulation with white noise in a sampled automatic frequency control system; multiradar tracking systems; and application of sputtering technology to microwave integrated circuit fabrication are discussed. For individual titles, see N84-26962 through N84-26965.

N84-26962# Selenia S.p.A., Rome (Italy). Naval System Div.
THE LIFE CYCLE COST OF INTEGRATED LOGISTIC SUPPORT
Ubaldo G. Florio *In its* Rivista Tec. Selenia, Vol. 8, No. 1 1982 p 1-5 refs (For primary document see N84-26961 17-32)
Avail: NTIS HC A03/MF A01

Scheduling of preventive maintenance within the general context of the life cycle cost of integrated logistic support is discussed. The principal categories of support cost are considered and a procedure of optimizing the total cost for the evaluation of a fundamental logistic parameters is developed using Markov models. The Markov approach allows the examination of the functional relationships between system reliability, maintenance policies and the costs of integrated logistic support. The life cycle cost of the logistic support is optimized, and the results permit a correct cost/efficiency scaling of the support. Author (ESA)

N84-26963# Selenia S.p.A., Rome (Italy). Development Lab.
FREQUENCY MODULATION WITH NOISE IN A SAMPLED AUTOMATIC FREQUENCY CONTROL (AFC) SYSTEM
Eugenia Licitri, Artur Masdea, and Giovanni Picardi *In its* Rivista Tec. Selenia, Vol. 8, No. 1 1982 p 6-13 refs (For primary document see N84-26961 17-32)
Avail: NTIS HC A03/MF A01

Frequency simulation is analyzed using white noise in a sampled automatic frequency control system by examining the problems of holding that arise when the value of the sampled frequency is contained within the band of the modulating signal. The analysis was effected by designing the system on the basis of the real characteristics of the components (voltage controlled oscillator, interferometer) that constitute it. Results show that the distortion of the signal spectrum after modulation is due to the ratio between the bandwidth of the modulating signal and the

sampling frequency; and bandwidth of the feedback. It is also shown that, in a modulator of the type examined, a system of frequency tracking is necessary even after an initial phase of locking (without modulation). Author (ESA)

N84-26964# Selenia S.p.A., Rome (Italy).
INTRODUCTION TO MULTIRADAR TRACKING SYSTEMS
Alfonso Farina and Sergio Pardini *In its* Rivista Tec. Selenia, Vol. 8, No. 1 1982 p 14-26 refs (For primary document see N84-26961 17-32)
Avail: NTIS HC A03/MF A01

Multiradar tracking (MRT) using distributed and centralized systems is discussed. Although MRT has advantages with respect to a monoradar system (e.g., a target may be tracked, with greater accuracy, over an area wider than the coverage of each radar) difficulties arise in organization and processing of measurement data. Unlike the monoradar case, the data organization according to azimuthal sectorization is not possible, because the measurements come from various spatial sectors in a nonuniform manner. In the overlapped area, the targets are detected by different radars which are asynchronously scanning and have different scan periods and accuracies. Author (ESA)

N84-26965# Selenia S.p.A., Rome (Italy).
APPLICATION OF SPUTTERING TECHNOLOGY TO MICROWAVE INTEGRATED CIRCUIT FABRICATION
Carlo Misiano, Enrico Simonetti, and Mauro Varasi *In its* Rivista Tec. Selenia, Vol. 8, No. 1 1982 p 27-37 refs (For primary document see N84-26961 17-32)
Avail: NTIS HC A03/MF A01

A sputtering system for microwave integrated microcircuits, which produces circuit structures with geometries up to 5 microns for lines and gaps, with a dimensional tolerance limit of + 1 micron with conductor thicknesses of 10 microns was developed. Application of etch sputtering for integrated resistor trimming enables resistor value adjustment without any change in surface geometry. Qualitative evaluation, based on small series production, confirms that costs on a line equipped for series production can be competitive with the costs for conventional technologies.
Author (ESA)

N84-26966# National Oceanic and Atmospheric Administration, Norman, Okla. National Severe Storms Lab.
REAL TIME DIVERGENCE MEASUREMENT FROM SINGLE DOPPLER RADAR Final Technical Report, 1 Jul. - 30 Sep. 1982
A. J. Koscielny Hanscom AFB, Mass. AFGL 1 Sep. 1983 45 p (AF Proj. 2781)
(AD-A140556; AFGL-TR-83-0299) Avail: NTIS HC A03/MF A01 CSCL 17/9

Mesoscale convergence is throught to influence development of convective storms. Convergence can be measured with a single Doppler radar if the wind field is approximately spatially linear. The algorithm for measuring convergence from radial velocities is presented. The algorithm is feasible for real time application to two elevation angles of a tilt sequence of five or more elevation angles. This convergence measurement technique is applied to widespread convective precipitation in central Oklahoma on April 9, 1978. Analysis results and the suitability of the spatial linearity assumption are discussed. Author (GRA)

N84-26967# Naval Postgraduate School, Monterey, Calif.
SPECIALIZED COMMON CARRIERS: LONG DISTANCE ALTERNATIVES FOR MILITARY INSTALLATIONS M.S. Thesis
S. L. Klingler Mar. 1984 205 p
(AD-A140596) Avail: NTIS HC A10/MF A01 CSCL 17/2

Specialized Common Carriers, communications carriers which came into existence offering private line microwave service, are now significant competitors in the long distance telecommunications industry. This thesis provides military installation telecommunications managers with a basic knowledge of how Specialized Common Carriers entered the telecommunications market, what services Specialized Common Carriers offer, and how to obtain these services for a military installation. It includes a case study evaluation of the potential use of long distance services of two of these competing common carriers at Naval Air Station Moffett Field, California. A computer program used to calculate the costs of using these two alternative long distance carriers is included as part of the case study. GRA

N84-26968# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DEFENSE SWITCHED NETWORK TECHNOLOGY AND EXPERIMENTS PROGRAM Annual Report, 1 Oct. 1982 - 30 Sep. 1983
C. J. Weinstein 30 Sep. 1983 57 p
(Contract F19628-80-C-0002)
(AD-A140609; ESD-TR-83-228) Avail: NTIS HC A04/MF A01 CSCL 17/2

This report documents work performed during FY 1983 on the DCA-sponsored Defense Switched Network Technology and Experiments Program. The areas of work reported are: (1) development of routing algorithms for application in the Defense Switched Network (DSN); (2) instrumentation and integration of the Experimental Integrated Switched Network (EISN) test facility; (3) development and test of data communication techniques using DoD-standard data protocols in an integrated voice/data network; and (4) EISN system coordination and experiment planning.
Author (GRA)

N84-26969# Stanford Univ., Calif. Dept. of Mathematics.
NONLINEAR PHENOMENA IN ELECTROMAGNETIC AND ACOUSTIC WAVE PROPAGATION Final Report, 15 Jan. 1981 - 14 Jan. 1984
J. B. Keller Apr. 1984 12 p
(Contract DAAG29-81-K-0032)
(AD-A140716; ARO-17902.40-MA) Avail: NTIS HC A02/MF A01 CSCL 20/14

We studied mathematical problems in electromagnetic and acoustic wave propagation which involve nonlinear partial differential equations, or linear partial differential equations with random coefficients. A general theory of weakly nonlinear high frequency wave propagation was developed which applies to waves in number of dimensions. It justifies the nonlinearization technique of Whitham and Landau and extends it to interacting waves and to other types of waves. The theory was successfully applied to weak shock diffraction. The theory of wave reflection from rough surfaces was extended to yield the correlation functions of the scattered field. It was found that the second order correlations could be expressed in terms of the reflection coefficient and the differential scattering cross section of the surface. GRA

N84-26970# Defense Communications Engineering Center, Reston, Va.
ENGINEERING AIDS FOR THE DESIGN OF SURVIVABLE DEFENSE COMMUNICATIONS TRANSMISSION CAPABILITY Final Technical Note
H. A. Stover Jan. 1984 50 p
(AF Proj. 1130)
(AD-A140755; DCEC-TN-11-82) Avail: NTIS HC A03/MF A01 CSCL 17/2

Adequate military communications are essential to the security of the United States, especially in the various stages of major wars. Enough communications must survive to make effective use of our military forces and weaponry, even in the face of a concerted enemy effort to destroy those communications. An evolutionary approach to provide survivability is recommended. It must be provided by the design engineer. Afterthought and modification must be replaced with foresight and design. The engineer must make survivability a criterion in every design decision. The design engineer needs help with the challenges and associated details of successfully accomplishing this. The author discusses and recommends development of convenient-to-use survivability engineering design tools to provide this help. Author (GRA)

N84-26971# Ohio State Univ., Columbus. Electroscience Lab.
IDENTIFICATION OF SCATTERING MECHANISMS FROM MEA-

SURED IMPULSE RESPONSE SIGNATURES OF SEVERAL CONDUCTING OBJECTS
W. J. Leeper Feb. 1984 92 p
(Contract N00014-78-C-0049)
(AD-A140773; ESL-712693-1) Avail: NTIS HC A05/MF A01 CSCL 17/9

The backscattered impulse response of several perfectly conducting objects has been measured and qualitatively compared to several theoretical predictions. The value of the impulse response waveform as a time history of scattering behavior is due to its unique relationship to geometry of the scatterer. This relationship is explored for local diffraction mechanisms, multiple diffraction between separate points on the scatterer, creeping waves, and natural resonances. Finally, it is demonstrated that a time domain view of a high frequency solution such as the Uniform Geometrical Theory of Diffraction offers a physically intuitive explanation for individual scattering mechanisms and multiple interactions. Author (GRA)

N84-26972# IIT Research Inst., Chicago, Ill.
REPRESENTATIVE ELECTROMAGNETIC FIELD INTENSITIES NEAR THE CLAM LAKE, WISCONSIN AND REPUBLIC, MICHIGAN ELF (EXTREMELY LOW FREQUENCY) FACILITIES
Jan. 1984 62 p
(Contract N00039-84-C-0070)
(AD-A140798) Avail: NTIS HC A04/MF A01 CSCL 17/2

Extremely low frequency electromagnetic fields produced by ELF antennas and commercial power lines at Clam Lake, WI, and by commercial power lines at Republic, MI, have been measured at residences, businesses and forest recreational areas for the continuing assessment of the Navy's ELF Communications Program. The ELF fields from existing antennas at Clam Lake, and from power lines in both states are low. Introducing ELF antenna fields at Republic, MI in several years will not significantly change the electromagnetic environment there. The existing field intensities are interpreted and compared with independent expert, judgment, professional standards-setting and judicial and administrative law opinions regarding safe exposure of the public to ELF electromagnetic fields. Author (GRA)

N84-26973*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ALTERNATIVE VOICE SWITCHING AND CONTROL SYSTEM DISPLAY PANEL FORMAT SIMULATION AND EVALUATION Final Report
M. L. Slonski and J. G. Stipanuk Feb. 1984 34 p
(NASA-CR-173644; JPL-D-1371; NAS 1.26:173644; AD-A140825; DOT/FAA/PM-84/6) Avail: NTIS HC A03/MF A01 CSCL 17B

This report documents Jet Propulsion Laboratories efforts in the simulation and evaluation of the three alternative displays proposed for the Voice Switching and Control System. It includes the identification of the initial display requirements, selection, simulation, and evaluation of the three proposed formats and also the definition and simulation of a final modified display format. Author (GRA)

N84-26974# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
MULTISENSOR SPEECH INPUT Final Technical Report, Feb. 1982 - Jul. 1983
V. R. Viswanathan, K. F. Karnofsky, K. N. Stevens, and M. N. Alakel Griffiss AFB, N.Y. RADC Dec. 1983 112 p
(Contract F30602-82-C-0064; AF Proj. LDFP)
(AD-A140894; RADC-TR-83-274) Avail: NTIS HC A06/MF A01 CSCL 17/1

The use of multiple sensors to transduce speech was investigated. A data base of speech and noise was collected from a number of transducers located on and around the head of the speaker. The transducers included pressure, first order gradient, second order gradient microphones and an accelerometer. The effort analyzed this data and evaluated the performance of a multiple sensor configuration. The conclusion was: multiple transducer configurations can provide a signal containing more useable speech information than that provided by a microphone. Author (GRA)

N84-26975# Florida Univ., Gainesville. Electronic Communications Lab.
BISTATIC RADAR CROSS SECTIONS OF HORIZONTALLY ORIENTED CHAFF
P. Z. Jr. Peebles Mar. 1984 39 p
(Contract DAAK21-83-C-0062; DA Proj. 1L6-626)
(AD-A140903) Avail: NTIS HC A03/MF A01 CSCL 17/4

Bistatic Radar Cross sections are determined for scattering from a cloud of randomly positioned resonant dipoles (chaff). Dipoles are assumed to be horizontally oriented with axes randomly oriented in the horizontal plane. The cloud is arbitrarily located relative to an illuminating source having an arbitrary (elliptical) polarization. Cloud cross section is found for an arbitrarily located receiver that views the cloud with an antenna of arbitrary polarization. A cross section applicable to the receiver's orthogonal polarization is also found. GRA

N84-26976# Virginia Highway and Transportation Research Council, Charlottesville.
MICROWAVE REFLECTION MEASUREMENTS OF THE DIELECTRIC PROPERTIES OF CONCRETE Final Report, Mar. 1982 - Oct. 1983
Gerardo G. Clemena Sep. 1983 36 p refs Sponsored in part by the Virginia Dept. of Highways and Transportation, Richmond (PB84-173624; FHWA/VA-84/10; VHTRC-84-R10) Avail: NTIS HC A03/MF A01 CSCL 13C

The use of microwave reflection measurements to continuously and nondestructively monitor the hydration of concrete is described. The method relies upon the influence of the free water content on the dielectric properties of the concrete. Use of the method on concrete blocks showed linear relations between the compressive strength, water cement ratio, and block thickness with the dielectric properties. Some of the method are discussed. Author (GRA)

N84-26977# National Telecommunications and Information Administration, Washington, D.C. Inst. for Telecommunication Sciences.
AMERICAL NATIONAL STANDARD X3.102 USER REFERENCE MANUAL
N. B. Seitz and D. S. Grubb (NBS) Oct. 1983 107 p refs
(PB84-155571; NTIA-Rept-83-125) Avail: NTIS HC A06/MF A01 CSCL 17B

A set of 21 standard parameters is defined to provide a uniform means of specifying the performance of data communication systems and services as seen by users. The benefits of using the standard from the viewpoint of the end user, the communication provider, and the communication manager are outlined. The standard's overall approach and are summarized content in informal, non-technical terms. The meaning and importance of each standard parameter are examined in a series of tutorial parameter descriptions. Typical parameter values are presented and their design implications are discussed. GRA

N84-26978# National Telecommunications and Information Administration, Washington, D.C. Inst. for Telecommunication Sciences.
EFFECT OF BANDWIDTH AND INTERFERENCE REJECTION ON THE SPECTRUM EFFICIENCY OF LAND MOBILE RADIO SYSTEMS
Daniel H. Cronin and Leslie A. Berry Dec. 1983 29 p refs
(PB84-158369; NTIA-Rept-83-139) Avail: NTIS HC A03/MF A01 CSCL 17B

Analytical and empirical results concerning the relative spectrum efficiency of two generic land mobile radio systems are presented. Graph theoretic frequency assignment techniques are used to relate spectrum usage to transmitter bandwidth, interference rejection characteristics, transmitter locations, frequency assignment techniques, and other system and deployment characteristics. A curve-fit equation is presented for estimating the amount

of spectrum needed to assign frequencies to transmitters of both types when they are randomly located in a square geographical area. Spectrum usage when transmitters are located at preferred sites or clustered near city centers is also discussed. GRA

N84-26979# Textron Bell Technical Operations, Tucson, Ariz.
PERFORMANCE OF TELECOMMUNICATIONS SYSTEMS IN A RANDOM PROBABILISTIC ENVIRONMENT. TASK 1: COMPARISONS OF SPREAD-SPECTRUM AND CONVENTIONAL NARROWBAND MODULATION METHODS
Jack Slattery Nov. 1983 54 p refs
(Contract NT-SAC-00093)
(PB84-158542; BTO-G-83-9-001; NTIA-CR-82-28) Avail: NTIS HC A04/MF A01 CSCL 17B

A method is presented for estimating the probability of error for a radio signal when contaminated by a single interfering source having random parameters. The probability of error that will exist as a result of channel separation and the amount of channel separation required to maintain an acceptable signal to interference ratio is determined. Statistical information is presented in the form of curves which depict the performance of links varying in length for several common scenarios. Calculation formats and a flow diagram are included to aid computer adaptation. GRA

N84-26980# Rice (Philip L.), Boulder, Colo.
MODIFICATION OF THE PROPAGATION MEASUREMENT FILE (PMF)
Philip L. Rice Feb. 1983 112 p refs
(Contract NT-81-SAA-00231)
(PB84-169796; NTIA-CR-83-23) Avail: NTIS HC A06/MF A01 CSCL 17B

The automated Propagation Measurement File (PMF) of NTIA/Office of Spectrum Managenment (OSM) and the Electromagnetic Compatibility Analysis Center (ECAC) includes extensive measurements of radio propagation loss over transmission paths near Boulder, Colorado. For some paths, since the received signal level was extremely small and could not be measured, the measurement system threshold level was recorded and documented. These threshold values were not identified or incorporated in the PMF when it was developed. These threshold values for incorporation in the PMF were identificed and coded. Other of these paths in the PMF have multiple antenna heights for height gain measurements. Quantization of these antenna heights into representative bins or height intervals, with corresponding nominal heights for convenience of statistical analysis of the measured data is induced. Methodologies for improving data bases of propagation measurements through use of multidimensional class intervals, or bins, are described. Tentative new definitions for effective antenna height are proposed. GRA

N84-26981# Textron Bell Technical Operations, Tucson, Ariz.
PERFORMANCE OF TELECOMMUNICATIONS SYSTEMS IN A RANDOM PROBABILISTIC ENVIRONMENT. TASK 2: SINGLE SOURCE INTERFERENCE WITH RANDOM PARAMETERS
Alex Thompson Nov. 1983 76 p refs
(Contract NT-SAC-00093)
(PB84-158534; BTO-G-83-8-001; NTIA-CR-83-29) Avail: NTIS HC A05/MF A01 CSCL 17B

Use of frequency hopping is compared to conventional frequency modulation and amplitude compandered single sideband in a typical large cell land mobile radio system such as might serve a large metropolitan area. Signal to interference ratio criterion values are analyzed on an average power basis in the intermediate frequency. This causes the results to depend on standard spread spectrum processing gain equations. The results indicate clear superiority for the single sideband system. The frequency hopping system could not obtain sufficient spread spectrum processing gain to overcome frequency hopping interference at the base stations. Statistics of transmission overlap, signal level, interference level, and signal to interference ratio at base and mobile receivers are given. GRA

N84-26822# Joint Publications Research Service, Arlington, Va.
ALGORITHMS OF ADAPTIVE MARKOV FILTRATION OF NOISY SPEECH SIGNALS Abstract Only
M. V. Nazarov, Yu. N. Prokhorov, and V. I. Kovyazin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-0070 29 May 1984 p 1 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 10-15 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26824# Joint Publications Research Service, Arlington, Va.
LOSS FUNCTION USED IN OPTIMIZATION OF ARRAY OF COUPLED TRACKING RADIOELECTRONIC SYSTEMS Abstract Only
V. B. Vagapov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 3 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 26-28 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26825# Joint Publications Research Service, Arlington, Va.
OPTIMIZATION OF TWO-COORDINATE SURFACE RADAR STATION BY COMBINATION OF TECHNICAL AND ECONOMIC INDICES Abstract Only
N. S. Gubonin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 3 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 33-34 Original language document was announced as A84-25439 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26826# Joint Publications Research Service, Arlington, Va.
SYNTHESIS OF DEVICES FOR OPTIMUM PROCESSING OF SIGNALS IN LOW-ALTITUDE RADIO ALTIMETER Abstract Only
Yu. N. Moiseyenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEW-84-007) 29 May 1984 p 4 Transl. into ENGLISH from Radiotehn. (Moscow), no. 1, Jan. 1984 p 50-53 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26829# Joint Publications Research Service, Arlington, Va.
ON THE POSSIBILITIES OF SINGLE-ANTENNA IONOSPHERE SOUNDING Abstract Only
A. M. Silayev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 6-7 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2097-2101 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26830# Joint Publications Research Service, Arlington, Va.
ELECTRODYNAMIC ANALYSIS OF ACTIVE WAVE-GUIDE SLOT LINE BASED ON GaAs Abstract Only
V. Ye. Lyubchenko and G. S. Makeyeva *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 7 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2102-2107 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26831# Joint Publications Research Service, Arlington, Va.
ON THE PROBLEM OF CYLINDRICAL ARRAY RADIATION THROUGH INHOMOGENEOUS DIELECTRIC LAYER Abstract Only
S. V. Kashin and V. N. Sergeyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 7-8 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2273-2276 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26832# Joint Publications Research Service, Arlington, Va.
CONCERNING Q OF A CYLINDRICAL DIELECTRIC RESONA-

TOR SCREENED BY A WAVEGUIDE Abstract Only
V. F. Vzyatyshev and V. I. Kalinichev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 8 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2277-2279 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26833# Joint Publications Research Service, Arlington, Va.
TRAJECTORIES OF RADIO WAVES IN LINEAR LAYER WITH ISOMETRIC INHOMOGENEITIES Abstract Only
S. M. Golynskiy and G. N. Khlybov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 8-9 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 62-64 (For primary document see N84-26821 17-31)
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STATISTICS OF FIELD OF MULTISTAGE PHASED ANTENNA ARRAY Abstract Only
A. G. Antipin and L. A. Dozorets *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 9 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 14-18 Original language document was announced as A84-25436 (For primary document see N84-26821 17-31)
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DETECTION OF SPACE-TIME SIGNAL WITH SCATTERING FROM BACKGROUND OF ISOTROPIC NOISE FIELD Abstract Only
V. A. Bogdanovich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 10 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 21-23 (For primary document see N84-26821 17-31)
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RADIOCHANNEL WITH CURVED ANTENNA UTILIZING THREE-DIMENSIONAL EXCITATION Abstract Only
N. F. Maksakov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 10 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 61-65 (For primary document see N84-26821 17-31)
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CHARACTERISTIC FAULTS OF INPUT STABILIZING AND CORRECTING EQUIPMENT IN TELEVISION TRANSMITTING STATIONS Abstract Only
V. D. Shabetnik *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 11 Transl. into ENGLISH from Vestn. Svyazi (Moscow), no. 9, Sep. 1983 p 31-32 (For primary document see N84-26821 17-31)
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METHOD OF FLICKER SUPPRESSION IN TELEVISION IMAGE Abstract Only
S. V. Novakoskiy, Ye. Z. Soroka, and A. N. Yulish *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 11-12 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 5-10 (For primary document see N84-26821 17-31)
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DISPERSION OF SEQUENTIAL DETECTION TIME FOR SIGNALS SUBMERGED IN AUTOREGRESSIONAL INTERFERENCE Abstract Only
G. B. Golfeld *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 12 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 54-56 (For primary document see N84-26821 17-31)
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ANALYSIS OF OPERATION OF FREQUENCY SYNTHESIZER OF TELEVISION RECEIVER WITH MICRO-ELECTRONIC COMPUTER IN A CONTROL CIRCUIT Abstract Only
A. V. Krivosheykin and B. Ya. Smirnov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 12-13 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 3-7 (For primary document see N84-26821 17-31)
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REQUIREMENTS TO BE MET BY PARAMETERS OF HIGH-DEFINITION TELEVISION SYSTEMS FOR CINEMATOGRAPHY Abstract Only
M. V. Antipin and L. L. Polosin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 13 Transl. into ENGLISH from Tekhn. Kino i Televideniya (Moscow), no. 1, Jan. 1984 p 14-20 (For primary document see N84-26821 17-31)
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HOW TO CHECK LINE CHANNEL OF IKM-15 DIGITAL PULSE-CODE-MODULATION TRANSMISSION SYSTEM Abstract Only
G. A. Abramov, M. M. Ptichnikov, and Yu. P. Savchenkov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 16 Transl. into ENGLISH from Vestn. Svyazi (Moscow), no. 9, Sep. 1983 p 29-31 (For primary document see N84-26821 17-31)
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N84-26844# Joint Publications Research Service, Arlington, Va.
EFFICIENCY COMPARISON OF QUASI-OPTIMUM DIRECTION FINDING ALGORITHMS USED FOR POINT SOURCES OF SIGNALS Abstract Only
S. I. Pochuyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 17 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 28-29 (For primary document see N84-26821 17-31)
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EVALUATION OF CHARACTERISTICS OF SYSTEM OF SPACE-TIME PROCESSING OF SIGNALS BY STATISTICAL SIMULATION METHOD Abstract Only
Kh. S. Agodisyan, V. A. Buryak, N. I. Neilo, and K. G. Papushin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 18 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 28-30 (For primary document see N84-26821 17-31)
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CONCERNING CRITERIA FOR EVALUATION OF AMPLITUDE-FREQUENCY CHARACTERISTIC OF TWO-SIGNAL SELECTIVITY OF RADIO RECEPTION CHANNEL Abstract Only
B. G. Telezhnyy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 18-19 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 34-36 (For primary document see N84-26821 17-31)
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METHOD OF ANALYSIS OF COMBINATION OSCILLATIONS OF ARBITRARY NONLINEAR SYSTEM FOR SPECTRUM CONVERSION Abstract Only
P. A. Popov and Ye. N. Moshnina *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 20 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 48-49 (For primary document see N84-26821 17-31)
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N84-26850# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF DURATION OF MULTICHANNEL SEQUENTIAL SIGNAL DETECTION PROCEDURE Abstract Only
M. M. Fishman *In its* USSR Rept.: Electron. and Elec. Eng.

(JPRS-UEE-84-007) 29 May 1984 p 22 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2169-2178 Original language document was announced as A84-22036 (For primary document see N84-26821 17-31)
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N84-26851# Joint Publications Research Service, Arlington, Va.
TIME CHARACTERISTICS OF SEARCH FOR COMPOUND SIGNALS WITH RESPECT TO DELAY Abstract Only
A. A. Fomin, *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 24 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 53-55 (For primary document see N84-26821 17-31)
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NOISE IMMUNITY OF OPTICAL LINES WITH IMPRECISE LEVELS OF SIGNAL AND NOISE Abstract Only
V. Yu. Anisimov and E. V. Borisov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 24 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 73-75 (For primary document see N84-26821 17-31)
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N84-27084*# Alaska Univ., Fairbanks. Geophysical Inst.
THE ECONOMICS OF DATA ACQUISITION COMPUTERS FOR ST AND MST RADARS
B. J. Watkins *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 40-48 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17B

N84-27085*# Illinois Univ., Urbana. Dept. of Electrical Engineering.
INTERPRETATION OF MST RADAR RETURNS FROM CLEAR AIR
C. H. Liu *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 49-56 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27086*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ON THE MORPHOLOGY OF THE SCATTERING MEDIUM AS SEEN BY MST/ST RADARS
K. S. Gage *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 57-67 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27087*# EISCAT Scientific Association, Kiruna (Sweden).
MORPHOLOGY OF THE SCATTERING TARGET: FRESNEL AND TURBULENT MECHANISMS
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 68-70 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27088*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
RANGE GATE DEPENDENCE OF SPECULAR ECHOES
J. L. Green *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 73-77 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27089*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
IS VHF FRESNEL REFLECTIVITY DUE TO LOW FREQUENCY BUOYANCY WAVES?
T. E. VanZandt and R. A. Vincent (Adelaide Univ., Australia) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 78-80 refs (For primary document see N84-27076 17-42)
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N84-27090*# Illinois Univ., Urbana. Aeronomy Lab.
MESOSPHERIC SCATTER AND ITS MICROSTRUCTURE
S. A. Bowhill and K. P. Gibbs *In* International Council of Scientific Unions. Middle Atmosphere Program, Vol. 9 Dec. 1983 p 81-82 ref (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
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N84-27091*# National Severe Storms Lab., Norman, Okla.
FRESNEL ZONE CONSIDERATIONS FOR REFLECTION AND SCATTER FROM REFRACTIVE INDEX IRREGULARITIES
R. J. Doviak and D. S. Zrnic *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 83-97 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27092*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
EFFECTS OF PULSE WIDTH AND CODING ON RADAR RETURNS FROM CLEAR AIR
C. R. Cornish *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 98-99 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27093*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
THE EFFECTS OF PULSE RATE, POWER, WIDTH AND CODING ON SIGNAL DETECTABILITY
D. A. Carter *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 100-104 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27094*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
SPECTRAL CHARACTERISTICS OF THE MST RADAR RETURNS
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 105-111 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27095*# EISCAT Scientific Association, Kiruna (Sweden).
SPECTRAL CHARACTERISTICS OF THE RETURN
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 112-113 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27096*# EISCAT Scientific Association, Kiruna (Sweden).
INTERPRETATION OF RADAR RETURNS FROM CLEAR AIR: DISCRIMINATION AGAINST CLUTTER
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 114-119 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27097*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
DISCRIMINATION AGAINST INTERFERING SIGNALS AT THE POKER FLAT MST RADAR
D. A. Carter *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 120-121 (For primary document see N84-27076 17-42)
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N84-27098*# Illinois Univ., Urbana. Aeronomy Lab.
PULSE STUTTERING AS A REMEDY FOR ALIASED GROUND BACKSCATTER
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 122-123 (For primary

document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27099*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE DELTA S (DELTA R)-2 QUESTION: THE PULSE-LENGTH DEPENDENCE OF SIGNAL POWER FOR FRESNEL SCATTER
W. K. Hocking *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 124-135 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27100*# Illinois Univ., Urbana. Dept. of Electrical Engineering.
JICAMARCA MESOSPHERIC OBSERVATIONS
O. Royrvik *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 136-142 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-19563)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27101*# EISCAT Scientific Association, Kiruna (Sweden).
ORIGIN OF REFRACTIVE INDEX FLUCTUATIONS IN THE MESOSPHERE AS OPPOSED TO THE STRATOSPHERE AND TROPOSPHERE
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 143-144 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27103*# Illinois Univ., Urbana. Aeronomy Lab.
NIGHTTIME MESOSPHERIC RETURNS ASSOCIATED WITH A LARGE SCALE FLARE EVENT
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 147-149 refs (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27104*# EISCAT Scientific Association, Kiruna (Sweden).
TECHNIQUES FOR MEASUREMENTS OF HORIZONTAL AND VERTICAL VELOCITIES
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 150-163 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27105*# Stanford Univ., Calif. STAR Lab.
TECHNIQUES FOR MEASUREMENT OF VERTICAL AND HORIZONTAL VELOCITIES: MONOSTATIC VERSUS BISTATIC MEASUREMENTS
A. T. Waterman *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 164-169 (For primary document see N84-27076 17-42)
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N84-27106*# Illinois Univ., Urbana. Aeronomy Lab.
A COMMENT ON SOME DRAWBACKS OF MONOSTATIC RADARS Abstract Only
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 170 (For primary document see N84-27076 17-17)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27107*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE SPACED ANTENNA DRIFT METHOD
W. K. Hocking *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 171-186 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27108*# Illinois Univ., Urbana. Aeronomy Lab.
SPACED ANTENNA DRIFT
O. Royrvik *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 187-191 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-81-19563)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27109*# National Severe Storms Lab., Norman, Okla.
AN EVALUATION OF THE ACCURACY OF SOME RADAR WIND PROFILING TECHNIQUES
A. J. Koscielny and R. J. Doviak *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 192-209 (For primary document see N84-27076 17-42)
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N84-27114*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
RADAR INTERFEROMETER MEASUREMENTS
D. T. Farley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 237-240 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27121*# Saskatchewan Univ., Saskatoon. Inst. of Space and Atmospheric Studies.
MEASUREMENT OF THE HORIZONTAL VELOCITY OF WIND PERTURBATIONS IN THE MIDDLE ATMOSPHERE BY SPACED MF RADAR SYSTEMS
C. E. Meek, A. H. Manson, and M. J. Smith *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 270-273 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27123*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
PARAMETRIZATION OF FRESNEL RETURNS IN MIDDLE-ATMOSPHERE RADAR EXPERIMENTS
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 280-285 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27124*# EISCAT Scientific Association, Kiruna (Sweden).
PARAMETRIZATION OF FRESNEL RETURNS
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 286-288 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27129*# EISCAT Scientific Association, Kiruna (Sweden).
CAPABILITIES AND LIMITATIONS OF EISCAT AS AN MST RADAR
J. Rottger, M. Baron (SRI International), and K. Folkestad (Norwegian Defence Research Establishment) *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 305-314 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27130*# Cornell Univ., Ithaca, N.Y.
CAPABILITIES AND LIMITATIONS OF THE JICAMARCA RADAR AS AN MST RADAR
R. F. Woodman (Inst. Geofisico del Peru) and D. T. Farley *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 315-319 refs (For primary document see N84-27076 17-42)
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N84-27131*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
CHARACTERISTICS OF SUNSET RADAR

J. L. Green *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 320-324 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27132*# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
CAPABILITIES AND LIMITATIONS OF EXISTING MST RADARS: COLORADO WIND PROFILERS
R. G. Strauch *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 325-329 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27133*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
CAPABILITIES AND LIMITATIONS OF EXISTING MST RADARS: POKER FLAT
B. B. Balsley, W. L. Ecklund, and D. A. Carter *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 330-337 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27134*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
COMPLEMENTARY CODE AND DIGITAL FILTERING FOR DETECTION OF WEAK VHF RADAR SIGNALS FROM THE MESOSCALE
G. Schmidt, R. Ruster, and P. Czechowsky *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 338-343 refs Repr. from IEEE Transactions on Geosci. Electron., vol. GE-17, no. 4, 1979 p 154-161 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27135*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
VHF RADAR MEASUREMENTS DURING MAP/WINE
P. Czechowsky, J. Klostermeyer, R. Ruster, G. Schmidt, and J. Rottger (EISCAT, Kiruna, Sweden) *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 344-345 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27136*# Illinois Univ., Urbana. Aeronomy Lab.
THE URBANA MST RADAR, CAPABILITIES AND LIMITATIONS
O. Royrvik and L. D. Goss *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 346-356 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27138*# Instituto Geofisico del Peru, Lima.
THE ARECIBO OBSERVATORY AS AN MST RADAR
R. F. Woodman *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 369-374 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27139*# Alaska Univ., Fairbanks. Geophysical Inst.
CAPABILITIES AND LIMITATIONS OF THE SONDRESTROM RADAR FOR ST OBSERVATIONS
B. J. Watkins *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 375-380 refs (For primary document see N84-27076 17-42)
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N84-27140*# Kyoto Univ. (Japan). Radio Atmospheric Science Center.
OUTLINE OF THE MU RADAR
S. Kato *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 381-382 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27141*# National Central Univ., Chung-Li (Taiwan). Dept. of Atmospheric Physics.
CHUNG-LI, TAIWAN DUAL MODE (DOPPLER AND SPACED ANTENNA) VHF RADAR: PRELIMINARY SPECIFICATIONS
J. Brosnahan (Tycho Technology, Inc., Boulder, Colo.), J. Chao, and J. Rottger (EISCAT, Kiruna, Sweden) *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 383-386 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27142*# Rutherford High Energy Lab., Chilton (England). Rutherford Appleton Lab.
DESIGN CONSIDERATIONS OF A PROPOSED UK VHF RADAR
A. J. Hall *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 387-397 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27143*# Tycho Technology, Inc., Boulder, Colo.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS (KEYNOTE PAPER)
J. W. Brosnahan *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 403-405 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27144*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS: DISTRIBUTED VERSUS SINGLE LARGE TRANSMITTER
W. L. Ecklund and B. B. Balsley *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 406-407 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27145*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
PULSE COMPRESSION USING BINARY PHASE CODES
D. T. Farley *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 410-414 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27146*# Instituto Geofisico del Peru, Lima.
DECODERS FOR MST RADARS
R. F. Woodman *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 416-420 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27147*# Kyoto Univ. (Japan). Radio Atmospheric Science Center.
A TRANSCEIVER MODULE OF THE MU RADAR
S. Kato, T. Ogawa, T. Tsuda, T. Sato, I. Kimura, and S. Fukao *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 421-423 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27148*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS: THE POKER FLAT MST RADAR PHASE CONTROL SYSTEM
W. L. Ecklund and P. E. Johnson *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 424-426 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27149*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR

TRANSCEIVERS: PHASE MATCHING LONG COAXIAL CABLES USING A CABLE RADAR
P. E. Johnson and W. L. Ecklund *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 427-428 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27150*# Tycho Technology, Inc., Boulder, Colo.
MST RADAR TRANSMITTER CONTROL AND MONITOR SYSTEM Abstract Only
J. W. Brosnahan *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 429-430 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27151*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS: T/R SWITCH DESIGN Abstract Only
W. L. Ecklund *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 431-432 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27152*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE MOBILE SOUSY-DOPPLER RADAR: TECHNICAL DESIGN AND FIRST RESULTS
P. Czechowsky, G. Schmidt, and R. Ruster *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 433-446 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27153*# Illinois Univ., Urbana. Aeronomy Lab.
DESIGN CONSIDERATIONS FOR MST RADAR ANTENNAS
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 447-455 refs (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27154*# Bharat Electronics Ltd., Ghaziabad (India).
DIRECTIVITY AND SPACING FOR THE ANTENNA ELEMENTS
V. K. Koshy *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 456-462 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27155*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
FULL VERSUS LIMITED VERSUS NO STEERABILITY
B. B. Balsley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 463-464 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27156*# Cornell Univ., Ithaca, N.Y.
SCHOOL OF ELECTRICAL ENGINEERING.
D. T. Farley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 465-466 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27157*# Tycho Technology, Inc., Boulder, Colo.
DELAY LINE AND MUTUAL COUPLING CONSIDERATIONS FOR MST RADAR ANTENNA ARRAYS
J. W. Brosnahan *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 467-469 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27158*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
REVIEW OF SPECIFIC ANTENNA CONFIGURATIONS: AN ESTIMATE OF COST AND PERFORMANCE VERSUS FREQUENCY FOR A SIMPLE (10 LAMBDA)-2 CLEAR-AIR RADAR ANTENNA ARRAY
W. L. Ecklund *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 470-476 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27159*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
DATA PROCESSING TECHNIQUES USED WITH MST RADARS: A REVIEW
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 477-488 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27163*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
A NOTE ON THE USE OF COHERENT INTEGRATION IN PERIODOGRAM ANALYSIS OF MST RADAR SIGNALS
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 509-512 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 20N

N84-27164*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
SIGNAL PROCESSOR ARCHITECTURE FOR BACKSCATTER RADARS
W. E. Swartz and P. Johnston (NOAA, College, Ark.) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 513-519 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 20N

N84-27165*# Illinois Univ., Urbana. Aeronomy Lab.
REAL-TIME MST RADAR SIGNAL PROCESSING USING A MICROCOMPUTER RUNNING UNDER FORTH
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 520 (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27166*# Illinois Univ., Urbana. Aeronomy Lab.
REVIEW OF CORRELATION TECHNIQUES
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 521-526 refs (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27167*# EISCAT Scientific Association, Kiruna (Sweden).
CORRELATION METHODS Abstract Only
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 527 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27168*# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
DATA ANALYSIS TECHNIQUES: SPECTRAL PROCESSING
R. G. Strauch *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 528-531 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27169*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.

SIGNAL PROCESSING AT THE POKER FLAT MST RADAR
D. A. Carter *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 532-534 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27170*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
PARMETERIZATION OF SPECTRA
C. R. Cornish *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 535-542 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27171*# Kyushu Inst. of Tech., Kitakyushu (Japan).
PROPERTIES OF ECHO SPECTRA OBSERVED BY MST RADARS
K. Wakasugi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27172*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
PARAMETERIZATION OF SPECTRUM
A. C. Riddle *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 546-547 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27173*# Instituto Geofisico del Peru, Lima.
SPECTRAL MOMENT ESTIMATION IN MST RADARS
R. F. Woodman *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 548-562 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27174*# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Electrical Enginering and Applied Physics.
THE DISCRETE PROLATE SPHEROIDAL FILTER AS A DIGITAL SIGNAL PROCESSING TOOL
J. D. Mathews, J. K. Breakall (California Univ., Lawrence Livermore Lab.), and G. K. Karawas *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 563-572 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-79-18379)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27237# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF VELOCITY SHEAR ON CHARACTER OF FLOW OF INCOMPRESSIBLE STRATIFIED FLUID AROUND OBSTACLE Abstract Only
I. G. Granberg *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 70 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1139-1150 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27242# Joint Publications Research Service, Arlington, Va.
DRIFT MOVEMENT OF AEROSOL PARTICLES IN FIELD OF ATMOSPHERIC GRAVITY WAVES Abstract Only
S. Kh. Rozenfeld *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 74 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 33-39 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27265*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
SPECTRASAT: A CONCEPT FOR THE COLLECTION OF GLOBAL DIRECTIONAL WAVE SPECTRA
Robert C. Beal *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 19-28 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 20N

N84-27270*# Canada Centre for Inland Waters, Burlington (Ontario).
DOES THE SCATTEROMETER SEE WIND SPEED OR FRICTION VELOCITY?
Mark A. Donelan and Willard J. Pierson, Jr. (City Coll. of the City Univ. of New York) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 75-87 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 20N

N84-27272*# Remote Sensing Systems, Sausalito, Calif.
NEW ALGORITHMS FOR MICROWAVE MEASUREMENTS OF OCEAN WINDS
Frank J. Wentz and Steve Peteherych (Atmospheric Environment Service, Downsview, Ontario) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 105-114 refs (For primary document see N84-27262 17-43)
(Contracts NASw-3606; N00014-83-C-0520)
Avail: NTIS HC A99/MF A01 CSCL 20N

N84-27274*# Canada Centre for Remote Sensing, Ottawa (Ontario).
THEORY AND MEASURE OF CERTAIN IMAGE NORMS IN SAR
R. Keith Raney *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 123-136 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27275*# Stanford Univ., Calif. Center for Radar Astronomy.
SYNTHETIC APERTURE RADAR IMAGES OF OCEAN WAVES, THEORIES OF IMAGING PHYSICS AND EXPERIMENTAL TESTS
John F. Vesecky, Stephen L. Durden, Martha P. Smith, and David A. Napolitano *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 137-148 refs Sponsored by NASA and ONR (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27276*# Nebraska Univ., Lincoln. Dept. of Electrical Engineering.
OPTIMUM BACKSCATTER CROSS SECTION OF THE OCEAN AS MEASURED BY SYNTHETIC APERTURE RADARS
Ezekiel Bahar, Clifford L. Rufenach (NOAA, Boulder, Colo.), Donald Barrick (NOAA, Boulder, Colo.), and Mary Ann Fitzwater *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 149-158 refs Submitted for publication (For primary document see N84-27262 17-43)
(Contract DAAG29-83-K-0123)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27277*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
TRACKING OCEAN WAVE SPECTRUM FROM SAR IMAGES
Andrew D. Goldfinger, Robert C. Beal, Francis M. Monaldo, and D. G. Tilley *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 159-168 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27278*# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
SAR IMAGERY OF OCEAN-WAVE SWELL TRAVELING IN AN ARBITRARY DIRECTION

Clifford L. Rufenach, Robert A. Shuchman (ERIM, Ann Arbor), and David R. Lyzenga (ERIM, Ann Arbor) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 169-178 refs (For primary document see N84-27262 17-43)
(NASA Order W-15084; Contract N00014-81-C-0692)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27279*# Royal Norwegian Council for Scientific and Industrial Research, Kjeller. Environmental Surveillance Technology Programme.
OCEAN WAVES AND TURBULENCE AS OBSERVED WITH AN ADAPTIVE COHERENT MULTIFREQUENCY RADAR
Dag T. Gjessing and Jens Hjelmstad *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 179-191 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27287*# National Center for Atmospheric Research, Boulder, Colo.
EVALUATION OF METEOROLOGICAL AIRBORNE DOPPLER RADAR
Peter H. Hildebrand and Cynthia K. Mueller *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 271-280 refs Sponsored by NSF (For primary document see N84-27262 17-43)
(NASA Order H-59314-B; Contract DTFA01-82-Y-10513)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27290*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
IMPROVED RESOLUTION RAIN MEASUREMENTS FROM SPACEBORNE RADAR ALTIMETERS
Julius Goldhirsh and Frank M. Monaldo *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 297-306 refs Sponsored by NASA. Goddard Space Flight Center and NASA. Wallops Flight Center (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 20N

N84-27300*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE EVOLUTIONARY TREND IN AIRBORNE AND SATELLITE RADAR ALTIMETERS
Leonard S. Fedor (NOAA, Boulder, Colo.) and Edward J. Walsh *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 391-402 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

N84-27301*# Max-Planck-Institut fuer Meteorologie, Hamburg (West Germany).
ON THE DETECTION OF UNDERWATER BOTTOM TOPOGRAPHY BY IMAGING RADARS
Werner Alpers *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 403-413 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N84-26962 Electrical Research Association, Leatherhead (England).
EVALUATION OF THE EFFECT OF NON-METALLIC INCLUSIONS IN STEEL ELECTRODES ON THE FREQUENCY OF FLASHBACKS IN MERCURY-ARC RECTIFIERS
V. V. Kraft 15 Jun. 1984 13 p refs Transl. into ENGLISH from Elektrotekhn. (USSR), no. 5, 1972
(BLL-ERA-Trans-3002/23) Avail: British Library Lending Div., Boston Spa, England

The effects of nonmetallic inclusions in the steel anode and the frequency of flashbacks are investigated using an experimental tube with a mercury cathode. Given an atmosphere of rarefied inert gas it is discovered that sulphide inclusions have the greatest effect on flashbacks, and silicate inclusions have the least effect. M.A.C.

N84-26963 Academy of Sciences of the Ukrainian SSR, Kharkov (USSR). Inst. of Radiophysics and Electronics.
SCATTERING PROPERTIES OF PARTLY SCREENED DIELECTRIC SPHERE
S. S. Winogradov, A. V. Sulima, and V. P. Shestopalov 1983 45 p refs In RUSSIAN; ENGLISH summary
(Rept-218) Copyright. Avail: Issuing Activity

The problem of scattering a cylindrically symmetrical beam by dielectric sphere with a partly screened, infinitely thin and perfectly conductive spherical cup is solved. A research of scattered field's characteristics both in near and distant zones of scatterer in resonance region of frequencies is carried out. M.A.C.

N84-26964# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
COMPARATIVE MEASUREMENT OF CAPACITANCE IN SOLAR CELLS FOR SPACE AND TERRESTRIAL APPLICATIONS M.S. Thesis - 10 Nov. 1983 [MEDIDAS COMPARATIVAS DE CAPACITANCIA EM CELULAS SOLARES DE USO ESPACIAL E TERRESTRE]
Paulo Nubile Apr. 1984 88 p refs In PORTUGUESE; ENGLISH summary
Avail: NTIS HC A05/MF A01

An electric circuit capable of measuring the capacitance of PN junctions under reverse bias was mounted. This circuit was used for characterizing monocrystalline silicon solar cells for terrestrial and space applications. The thermic cycle and radiation damage effects on solar cells in the space and its influence on the CxV curves were studied for verifying the possibility of occurring significative alterations on doping profiles of the analyzed cells. Author

N84-26985# Virginia Polytechnic Inst. and State Univ., Blacksburg.
LEAKAGE CURRENTS IN DEGRADED MULTI-LAYER CERAMIC CAPACITORS
L. C. Burton 26 Mar. 1984 8 p
(Contract N00014-83-K-0168)
(AD-A140157) Avail: NTIS HC A02/MF A01 CSCL 09/1

Leakage currents in new and degraded X7R type multi-layer ceramic capacitors show both ohmic and space charge limited behavior. The near-3/2 power voltage characteristic (I proportional to V to the 3/2 power) of new devices can be attributed to electron emission from electrode points. The quadratic behavior (I proportional to V squared) for moderately degraded devices represents space charge limited emission from planar electrodes. This emission may evolve from the point emission due to resistivity decreases that occur in the emission region as a result of ion

movement. For these currents, electrons are believed to be the dominant charge carriers. Neither Schottky nor Poole-Frenkel currents were identified. GRA

N84-26986# Princeton Univ., N. J. Dept. of Electrical Engineering and Computer Science.
PRINCETON VLSI PROJECT Semiannual Report, 1 Nov. 1982
R. J. Lipton 1 Nov. 1982 55 p
(Contract N00014-81-K-0681)
(AD-A140588) Avail: NTIS HC A04/MF A01 CSCL 05/1

This paper analyzed the effect of introducing drivers to speed up signals along many long wires in a VLSI layout. It was shown that, under all but the most naive of designs for a driver (i.e., the case when drivers have constant width, and occupy area proportional to the length of the wire they drive), these drivers can be introduced with only a polynomial increase in area. With the additional assumption that drivers can be embedded in a square region. It was shown that the area at most squares by their introduction. All results have matching upper- and lower-bounds. The authors also presented an area-delay trade-off in the design of drivers, and generalized the upper-bound proof technique. GRA

N84-26987# Texas Univ., Austin. Dept. of Electrical Engineering.
ANALYSIS OF TRANSMISSION LINES ON SEMICONDUCTOR SUBSTRATE
Y. C. Shih and T. Itoh 1 Mar. 1984 59 p
(Contract N00014-79-C-0553)
(AD-A140711; UT-MW-84-2) Avail: NTIS HC A04/MF A01 CSCL 09/5

An efficient numerical method based on the application of Galerkin's method in the spectal domain is proposed to obtain the propagation constant and characteristic impedance of planar transmission lines used in monolithic microwave integrated circuits. First, the transmission line properties of a conductor backed coplanar waveguide are analyzed. For a fixed substrate thickness, the characteristic impedance and phase constant may be varied independently by adjusting the width of the center strip and slots in the transmission line. Then microstrip lines and coplanar be varied independently by adjusting the width of the center strip and slots in the transmission line. Then microstrip lines and coplanar waveguides formed with MIS and Schottky barrier contacts are analyzed. Depending on the frequency and the resistivity of the semiconductor substrate, three different types of fundamental modes are predicted. The calculated slow wave factors and attenuation constants agree well with experimental results.
Author (GRA)

N84-26988# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
AUGER CHARACTERIZATION OF NEW AND AGED DISPENSER CATHODE SURFACES
G. Eng, H. K. A. Kan, and K. T. Luey 1 Feb. 1984 22 p
(Contract F04701-83-C-0084)
(AD-A140754; TR-0084(4945-02)-1; SD-TR-83-96) Avail: NTIS HC A02/MF A01 CSCL 09/1

The major changes in dispenser cathode surface signatures caused by aging were studied on B-type dispenser cathodes by operating them at high temperatures. By means of a computerized scanning Auger microprobe (SAM), the surface characteristics of three aged cathodes were measured and compared with those of a new cathode. Several hundred points were monitored on each sample to develop a good statistical description of each cathode surface, including both the impregnated pore ends and the tungsten regions between the pores. A method of discrimination between impregnant regions and tungsten regions has been developed, based on differences in the oxygen Auger peak shape and position. The results show that a surprisingly large fraction (greater than 70%) of the new cathode surface could be similar to the impregnant. This fraction decreases to near 20% with age. The elemental composition of these different regions was examined by correlating the presence of each element to others. The elemental correlation showed that the dominant fraction of the cathode surface in early life is similar to a barium-oxide on tungsten, and the cathode changes to an increasing fraction of surface tungsten oxide with aging. GRA

N84-26989# North Texas State Univ., Denton. Dept. of Physics.
STUDY OF VUV GENERATION BY COHERENT RESONANT FREQUENCY MIXING IN METAL VAPORS Annual Report, 1 Oct. 1982 - 31 Oct 1983
J. C. Diels 30 Jan. 1984 54 p
(AF Proj. 2301)
(AD-A140800; AFOSR-84-0256TR) Avail: NTIS HC A04/MF A01 CSCL 09/5

The properties of multiphoton resonances (two, four or more) are exploited to enhance up-frequency conversion rates. Simultaneously, the property of reversibility of coherent interaction is used to minimize the resonant losses (two-photon, four photon absorption). A source of tunable, near bandwidth limited pulses, of more than a millijoule energy per pulse has been developed. A new scheme of computer controlled data acquisition system made it possible to analyse, for the first time, the temporal coherence properties of the amplified pulses (at a rate of 20 pps). The method of interferometric autocorrelation has been applied to the study of multiphoton coherences. Two photon transmission measurements were performed through a heat pipe containing lithium vapor.
Author (GRA)

N84-26990# Stanford Univ., Calif. Electronics Lab.
DEFECTS AT ELECTRODE-OXIDE AND ELECTRODE-SILICON INTERFACES IN VHSI DEVICE STRUCTURES Final Report, 17 Aug. 1980 - 31 Dec. 1983
C. R. Helms, M. A. Taubenblatt, P. W. Lew, and J. D. Plummer 1 Apr. 1984 24 p
(Contract DAAG29-80-K-0059)
(AD-A140814; ARO-17673.6-EL) Avail: NTIS HC A02/MF A01 CSCL 09/1

The effect of impurities on the electrical properties of metal silicon interfaces has been investigated for Pt, Ta, Ti, Hf, and their silicides. These silicon-electrode systems are of critical importance in VHSIC and other VLSI systems. The impurities investigated include oxygen (as in SiO2 or metal oxides), carbon, and silicon dopants. In order to quantitatively determine the effect of these impurities on the electrical properties of the neutral silicon interface microanalysis measurements have been combined in situ with measurements of Schottky barrier height via internal photoemission. Using this combination of techniques, the interface chemical composition can be determined and related to the measured Schottky barrier height. With a few exceptions, we have found that reliable, reproducible, Schottky diodes on silicon can only be formed if the metal silicon structure is annealed above the silicide formation temperature, so that the silicide formation reaction can clean up the interface. In addition, we have determined the mechanism for the poor reproducibility in barrier height for a number of refractory metal silicon contacts which is related to thin oxides that may be present at the interface. Author (GRA)

N84-26991# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
LONG-LIFE, HIGH-CURRENT THYRATRONS FOR FAST DISCHARGE LASERS Final Report, May 1982 - Oct. 1983
Wright-Patterson AFB, Ohio AFWAL Mar. 1984 33 p Prepared in cooperation with Impulse Electronics, Inc., Lexington, Mass.
(Contract F33615-82-C-2244; AF Proj. 2301)
(AD-A140817; MSNW-C-11-218-01; AFWAL-TR-84-2003) Avail: NTIS HC A03/MF A01 CSCL 09/1

An experimental linear thyratron, 10 cm long, has been fabricated and tested as a prototype linearly-scalable, low-inductance, long-life closing switch for short pulse duration parallel plate pulse modulators. Voltage holdoff to 25 kV and peak current of 2 KA at 15 kV were demonstrated. The discharge plasma spread uniformly along the entire 10 cm length of the thyratron when operated with no external cathode heater power. Author (GRA)

N84-26992# Howard Univ., Washington, D. C. Dept. of Electrical Engineering.
DEVELOPMENT OF SHORT GATE FET'S Annual Report, Jun. 1982 - Jun. 1983
M. G. Spencer Dec. 1983 20 p
(Grant AF-AFOSR-0223-81; AF Proj. 2305)
(AD-A140819; AFOSR-83-1215TR) Avail: NTIS HC A02/MF A01 CSCL 09/1

Annual results on research for development of short gate FET's is reported. High material purity was obtained on in house liquid phase and vapor phase reactors. Quarter micron metal lines have been fabricated using deep UV lithography. Author (GRA)

N84-26993# OMEGA-P, Inc., New Haven, Conn.
GYROTRON BACKWARD-WAVE OSCILLATOR Final Report
S. Y. Park Sep. 1983 36 p
(Contract N00014-82-C-2084)
(AD-A140908) Avail: NTIS HC A03/MF A01 CSCL 09/5

A linear theory for a gyrotron backward wave oscillator (BWO) has been developed and is presented in this report. The theory solves a reduced one-dimensional Maxwell-Vlasov equation in the form of a linear integro-differential equation using Lapiace transformation. The relative amplitudes among the waveguide modes and beam modes are completely determined and enable us to determine BWO oscillation conditions. A design is made based upon this analysis including velocity spread effects. A several tens kilowatt power level gyrotron BWO may be possible and find useful applications as RF heating sources in fusion devices and as driving sources in high power gyrotron amplifiers. Author (GRA)

N84-26994# Hahn-Meitner-Institut fuer Kernforschung, Berlin (West Germany). Bereich Datenverarbeitung und Elektronik.
GfW HANDBOOK: IRRADIATION TEST GUIDELINES FOR RADIATION HARDNESS OF ELECTRONIC COMPONENTS
D Braeunig, F. Wulf, W. Gaebler, and A. Boden Dec. 1982 144 p refs Submitted for publication
(Contract BMFT-01XO078-AK/RT-WRT2076)
(HMI-B-380; TN-53/10) Avail: NTIS HC A07/MF A01

Irradiation test methods and standardized application are proposed, in order to improve comparison of test results. The interaction of different radiation species with matter (ionization and displacement) is described. Application of appropriate radiation sources, dosimetry problems, and sheilding for simulating space radiation effects by laboratory testing are discussed. Irradiation sources are characterized. Flowcharts of the planning and running of irradiation tests are given. Guidelines for running the tests are established. The test system can handle devices of high complexity, up to microprocessors. Author (ESA)

N84-26827# Joint Publications Research Service, Arlington, Va.
STABLE HETERODYNING SYSTEM IN RT-22 RADIO TELESCOPE FOR MILLIMETRIC-WAVE SPECTROSCOPY Abstract Only
V. A. Gusev and R. L. Sorochenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 5 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1205-1209 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26843# Joint Publications Research Service, Arlington, Va.
NOISE OF 1/f FORM IN POLYCRYSTALLINE ALUMINUM FILMS Abstract Only
V. V. Potemkin, I. S. Bakshi, and G. P. Zhigalskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 17 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2211-2216 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26847# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF ASYNCHRONOUS DETECTOR WITH SELF-PUMPING BASED ON GUNN DIODE Abstract Only
A. N. Levterov, A. F. Radchenko, and V. I. Krotov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 19 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 37-38 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26848# Joint Publications Research Service, Arlington, Va.
SYNTHESIS OF FREQUENCY SPECTRA BASED ON USE OF MULTILEVEL PULSE SEQUENCES Abstract Only
A. S. Ananyev and S. N. Popov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 19 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 45-47 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26853# Joint Publications Research Service, Arlington, Va.
PROCEDURE FOR CALCULATION OF STAGES WITH OPERATIONAL DIRECT-CURRENT AMPLIFIERS Abstract Only
G. M. Taranets, B. A. Tonakanov, and N. S. Yefimov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 25 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 78-71 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26857# Joint Publications Research Service, Arlington, Va.
CRITERIA FOR ACCURACY OF ROTARY TRANSFORMERS Abstract Only
V. I. Bogdanov, G. V. Tazov, and V. V. Khrushchev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 28 Transl. into ENGLISH from Elek. (Moscow), no. 1, Jan. 1984 p 55-56 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26858# Joint Publications Research Service, Arlington, Va.
CROSS SECTION FOR ABSORPTION OF PARTLY SHIELDED DIELECTRIC SPHERE Abstract Only
S. S. Vinogradov and A. V. Sulima *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 29 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1276-1281 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26859# Joint Publications Research Service, Arlington, Va.
ACTION OF EXTERNAL INTERFERENCE-CARRYING FIELD ON NONUNIFORM MULTIWIRE SHIELD Abstract Only
V. M. Bondar *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 30 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 68-69 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26860# Joint Publications Research Service, Arlington, Va.
EFFECT OF MULTIFOLD TRAPPING OF CARRIERS ON TRANSIENT PHOTOCURRENT IN AMORPHOUS SEMICONDUCTORS Abstract Only
V. I. Arkhipov, Yu. A. Popova, and A. I. Rudenko *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 31 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1817-1822 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26865# Joint Publications Research Service, Arlington, Va.
COUPLING OF CURRENT AND FREQUENCY-MODULATED NOISE IN GUNN OSCILLATORS Abstract Only
M. D. Vorobyev, S. M. Sklizney, L. P. Smirnov, and A. I. Popov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-0070 29 May 1984 p 34 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2294-2297 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26866# Joint Publications Research Service, Arlington, Va.
EQUIPMENT AND RESULTS OF TEST OF COOLER FOR ELECTRO-OPTICAL TRANSDUCER Abstract Only
M. G. Verdiyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 34-35 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Energ. (Minsk), no. 2, Feb. 1984 p 117-119 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26867# Joint Publications Research Service, Arlington, Va.
PULSE AND INTERVAL DISTRIBUTOR WITH SENSOR CONTROL Abstract Only
V. I. Sokolov, Uemiit, W. K. Baliyev, N. S. Kondratev, and B. N. Ivanov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 36 Transl. into ENGLISH from Avtomat., Telemekhan. i Svyaz (Moscow), no. 11, Nov. 1983 p 9-11 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26877# Joint Publications Research Service, Arlington, Va.
ELLIPSOIDAL MAGNETOSTATIC SHIELD Abstract Only
M. Ye. Zarudi *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 42 Transl. into ENGLISH from Elektr. (Moscow), no. 1, Jan. 1984 p 29-32 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26878# Joint Publications Research Service, Arlington, Va.
TWO-STAGE REGENERATIVE MICROWAVE AMPLIFIERS WITH REDUCED NONLINEAR DISTORTIONS Abstract Only
V. B. Tekshev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 43 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 12, Dec. 1983 p 64-67 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26879# Joint Publications Research Service, Arlington, Va.
PHASE INVERTER BASED ON DIELECTRIC STRIPLINE WAVEGUIDE WITH MOBILE METAL PLATE Abstract Only
B. A. Murmuzhev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 44 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 71-72 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26880# Joint Publications Research Service, Arlington, Va.
AUTOMATIC MEASUREMENT OF BANDWIDTH OF MICROWAVE RESONATORS Abstract Only
Ye. P. Metsner *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 44 Transl. into ENGLISH from Radiotekhn. (Moscow), no. 1, Jan. 1984 p 84-86 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26881# Joint Publications Research Service, Arlington, Va.
TRANSFORMERS WITH VOLTAGE REGULATION FOR ELECTRIC SUPPLY NETWORKS Abstract Only
I. V. Yakimets, V. G. Narovlyanskiy, and V. M. Matveykin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 45 Transl. into ENGLISH from Elektr. (Moscow), no. 1, Jan. 1984 p 1-5 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26882# Joint Publications Research Service, Arlington, Va.
STABILITY OF FUSES UNDER CYCLIC LOAD Abstract Only
K. K. Namitokov and I. G. Shklovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 46 Transl. into ENGLISH from Elektr. (Moscow), no. 1, Jan. 1984 p 46-49 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26883# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF PLANE PHASED ARRAY OF PIEZOELECTRIC TRANSDUCERS WITH ONE-LOBE DIRECTIVITY DIAGRAM Abstract Only
V. M. Moskalev, Yu. L. Oboznenko; Ye. N. Smirnov, and V. A. Yakovlev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 48 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2292-2294 Original language document was announced as A84-22051 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26891# Joint Publications Research Service, Arlington, Va.
NEW MATERIAL, PROCESS SPINS OFF FROM VOLVO LCP 2000 PROGRAM
In its West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 12-14 refs Transl. into ENGLISH from Plastform Scandinavia (Helsingborg, Sweden), no. 1/2, 1984 p 46-47 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

N84-26894# Joint Publications Research Service, Arlington, Va.
DESCRIPTION OF FRG BASIC RESEARCH IN X-RAY LITHOGRAPHY
Franz Frisch *In its* West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 43-46 refs Transl. into ENGLish from Die Zeit (Hamburg), 23 Mar. 1984 p 31 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

N84-27162*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
COHERENT INTEGRATION
D. T. Farley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 507-508 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 09C

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N84-26995# British Library Lending Div., Boston Spa (England).
ENGINEERING METHOD OF CALCULATING THE TEMPERATURE FIELD OF SOLID AND HOLLOW CYLINDERS
K. I. Skorikov and A. G. Sabelnikov 29 Mar. 1984 8 p refs Transl. into ENGLISH from Izv. (USSR) p 130-133
(BLL-M-35561-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Relatively simple relations are derived by means of which an analysis is carried out of the thermal state of solid and hollow cylinders during their heating with various boundary conditions. The proposed procedure is more accurate than that used previously, and is based on a thermal conduction model according to which the heat flow arriving permeates the body gradually, the thickness of the heated layer continually increasing and only encompassing the whole cross section after a certain time. This completes the inertial stage and is followed by regular heating.
Author

N84-26996# British Library Lending Div., Boston Spa (England).
INVESTIGATION OF THE CHARACTERISTICS OF A VENTILATED TRANSPARENT SHIELD
V. N. Brinza and V. G. Portnov 29 Mar. 1984 7 p refs Transl. into ENGLISH from Izv. (USSR) p 140-143
(BLL-M-35562-(5828.4)) Avail: British Library Lending Div., Boston

Spa, Engl.

The use of ventilation of double windows with ionized air to improve cooling in situations where they are acting as shields to improve the work-place environment is discussed in the light of model experiments. The experiments showed that with the same air flow rate the electrohydrodynamic method of cooling makes the shield more effective, and could therefore find application in cases when an increase in air fow rate in the hydrodynamic method is no longer effective. On the basis of a published hypothesis of the electrohydrodynamic method, confirmed by the experiments, empirical formulae are derived for engineering calculations on cooling shields. Author

N84-26997 Purdue Univ., Lafayette, Ind.
DEVELOPMENT OF A 2-DIMENSIONAL TURBULENT JET UNDER NATURAL AND EXCITED CONDITIONS Ph.D. Thesis
Flint Owen Thomas 1983 380 p
Avail: Univ. Microfilms Order No. DA8407614

The development of both the natural and acoustically excited two dimensional turbulent jet is studied. The acoustic excitation consisted of a symmetric pressure perturbation imposed upon the flow. Two representative excitation conditions (in addition to the natural jet) are considered in detail. Structural patterns characteristic of the development are derived from longitudinal fluctuation spectra, lateral correlation (phase angle) and correlation based two dimensionality measurements. The large scale structural patterns in the excited flows are typically quite different (in terms of phase angle, characteristic wavelength and two dimensionality) than occur naturally. These differences appear to take the form of an extended structure possessing lateral inclination and aligned approximately with the direction of mean shear. Dissert. Abstr.

N84-26998 Purdue Univ., Lafayette, Ind.
LARGE EDDY INTERACTIONS IN CURVED WALL BOUNDARY LAYERS: MODEL AND IMPLICATIONS Ph.D. Thesis
Seung Kyu Hong 1983 202 p
Avail: Univ. Microfilms Order No. DA8407555

An analytical framework, called the Large Eddy Interaction Model (LEIM), has been developed based on the identification of large eddies that undergo changes in a flow on account of interaction with the mean flow and the spectrum of eddies present in the turbulence. The mean flow may, in general, involve inhomogeneous shear, such as in a boundary layer flow. The eddy-eddy interactions give rise to transport process, which may be modelled on the basis of simple gradient diffusion or alternatively, the hypothesis of a velocity scale for the evolution of the turbulence field. The structure of a large eddy can then be utilized to determine various aspects of the structure of turbulence under given initial and boundary conditions. Curved wall boundary layers present an important case of complex turbulent flows. Considering four sets of experimental data available on variously curved wall flows, the applicability of LEIM has been tested. In each case the objective has been to obtain turbulent stress distributions, stress ratios and anisotropy as well aas the deformation of the eddy in terms of wave number and orientation. Dissert. Abstr.

N84-26999 College of William and Mary, Williamsburg, Va.
LONG-TIME STATES OF INVERSE CASCADES IN THE PRESENCE OF A MAXIMUM LENGTH SCALE Ph.D. Thesis
Murshed Hossain 1983 134 p
Avail: Univ. Microfilms Order No. DA8407035

It is shown numerically, both for the two-dimensional Navier-Stokes equations and for two-dimensional magnetohydrodynamics, that the long-time asymptotic state in a forced inverse-cascade situation is one in which the spectrum is completely dominated by its own fundamental. The growth continues until the fundamental is dissipatively limited by its own disspation rate. An algebraic model is proposed for the dynamics of such a final state.
Dissert. Abstr.

N84-27000 Rutgers - The State Univ., New Brunswick, N. J.
NUMERICAL SIMULATION OF SHOCK/TURBULENT BOUNDARY LAYER INTERACTIONS OVER 2-D COMPRESSION CORNERS Ph.D. Thesis
Miguel Visbal 1983 183 p
Avail: Univ. Microfilms Order No. DA8406413

A computational study of shock wave/turbulent boundary layer interactions over two dimensional compression corners at Mach 3 is presented. The Baldwin-Lomax turbulence model for two dimensional, supersonic interactions was investigated. A general purpose computer code was developed for the numerical solution of the two dimensional compressible Reynolds averaged Navier-Stokes equations, with turbulence represented by an algebraic eddy viscosity model. The developed Navier-Stokes computer code was successfully validated by application to a variety of test cases including inviscid shocked flows, laminar and turbulent boundary layers, and shock/laminar boundary layer interactions. Compressions ramp flowfields were simulated using the Navier-Stokes equations together with three different versions of the Baldwin-Lomax turbulence model, including the incorporation of a relaxation technique. The turbulence models were evaluated by a detailed comparison with available experimental data for compression ramp flows at Mach 3 and over a range of corner angle and Reynolds number. All of the turbulence models tested fail to simulate the rapid recovery of the boundary layer downstream of reattachment. Dissert. Abstr.

N84-27001*# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
MULTIPLE BUOYANCY DRIVEN FLOWS IN A VERTICAL CYLINDER HEATED FROM BELOW
Y. Yamaguchi, C. J. Chang, and R. A. Brown Feb. 1983 68 p refs Sponsored by NASA
(NASA-CR-173626; NAS 1.26:173626) Avail: NTIS HC A04/MF A01 CSCL 20D

The structure of axisymmetric buoyancy-driven convection in a vertical cylinder heated from below is probed by finite element solution of the Boussinesq equations coupled with computed-implemented perturbation techniques for detecting and tracking multiple flows and for determining flow stability. Results are reported for fluids with Prandtl number of one and for cylinders with aspect ratio (Lambda) (defined as the height to radius of the cylinder) between 0.5 and 2.25. Extensive calculations of the neutral stability curve for the static solution and of the nonlinear motions along the bifurcating flow families show a continuous evolution of the primary cellular motion from a single toroidal cell to two and three cells nested radially in the cylinder, instead of the sharp transitions found for a cylinder with shear-free sidewalls. The smooth transitions in flow structure with Rayleigh number and lambda are explained by nonlinear connectivity between the first two bifurcating flow families formed either by a secondary bifurcation point for Lambda > or = Lambda * approximately 0.80 or by a limit point for Lambda > Lambda *. The transition between these two modes may be described by the theory of multiple limit point bifurcation. Author

N84-27002*# Scientific Research Associates, Inc., Glastonbury, Conn.
SOLUTION OF 3-DIMENSIONAL TIME-DEPENDENT VISCOUS FLOWS. PART 2: DEVELOPMENT OF THE COMPUTER CODE
Bernard C. Weinberg and Henry Mcdonald Dec. 1980 82 p refs 3 Vol.
(Contract NAS2-10016)
(NASA-CR-166565-Pt-2; NAS 1.26:166565-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 20D

There is considerable interest in developing a numerical scheme for solving the time dependent viscous compressible three dimensional flow equations to aid in the design of helicopter rotors. The development of a computer code to solve a three dimensional unsteady approximate form of the Navier-Stokes equations employing a linearized block emplicit technique in conjunction with a QR operator scheme is described. Results of calculations of several Cartesian test cases are presented. The computer code can be applied to more complex flow fields such as these encountered on rotating airfoils. M.A.C.

N84-27003*# Scientific Research Associates, Inc., Glastonbury, Conn.
SOLUTION OF 3-DIMENSIONAL TIME-DEPENDENT VISCOUS FLOWS. PART 3: APPLICATION TO TURBULENT AND UNSTEADY FLOWS
Bernard C. Weinberg and Henry McDonald Sep. 1982 93 p refs 3 Vol.
(Contract NAS2-10016)
(NASA-CR-166565-Pt-3; NAS 1.26:166565-Pt-3) Avail: NTIS HC A05/MF A01 CSCL 20D

A numerical scheme is developed for solving the time dependent, three dimensional compressible viscous flow equations to be used as an aid in the design of helicopter rotors. In order to further investigate the numerical procedure, the computer code developed to solve an approximate form of the three dimensional unsteady Navier-Stokes equations employing a linearized block implicit technique in conjunction with a QR operator scheme is tested. Results of calculations are presented for several two dimensional boundary layer flows including steady turbulent and unsteady laminar cases. A comparison of fourth order and second order solutions indicate that increased accuracy can be obtained without any significant increases in cost (run time). The results of the computations also indicate that the computer code can be applied to more complex flows such as those encountered on rotating airfoils. The geometry of a symmetric NACA four digit airfoil is considered and the appropriate geometrical properties are computed. M.A.C.

N84-27004*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A NUMERICAL STUDY OF THE 2- AND 3-DIMENSIONAL UNSTEADY NAVIER-STOKES EQUATIONS IN VELOCITY-VORTICITY VARIABLES USING COMPACT DIFFERENCE SCHEMES Final Report
Thomas B. Gatski and Chester E. Grosch (Old Dominion Univ., Norfolk, Va.) May 1984 21 p refs
(Contract NAS1-17070)
(NASA-CR-172353; ICASE-84-15; NAS 1.26:172353) Avail: NTIS HC A02/MF A01 CSCL 20D

A compact finite-difference approximation to the unsteady Navier-Stokes equations in velocity-vorticity variables is used to numerically simulate a number of flows. These include two-dimensional laminar flow of a vortex evolving over a flat plate with an embedded cavity, the unsteady flow over an elliptic cylinder, and aspects of the transient dynamics of the flow over a rearward facing step. The methodology required to extend the two-dimensional formulation to three-dimensions is presented. Author

N84-27005*# California Inst. of Tech., Pasadena. Seismological Lab.
A CRITICAL ASSESSMENT OF VISCOUS MODELS OF TRENCH TOPOGRAPHY AND CORNER FLOW
Jinjun Zhang, Bradford H. Hager, and Arthur Raefsky 18 Jun. 1984 55 p refs Sponsored in part by the Alfred F. Sloan Foundation
(Grant NsG-7610)
(NASA-CR-173648; NAS 1.26:173648; Contrib-4120) Avail: NTIS HC A04/MF A01 CSCL 20D

Stresses for Newtonian viscous flow in a simple geometry (e.g., corner flow, bending flow) are obtained in order to study the effect of imposed velocity boundary conditions. Stress for a delta function velocity boundary condition decays as 1/R(2); for a step function velocity, stress goes as 1/R; for a discontinuity in curvature, the stress singularity is logarithmic. For corner flow, which has a discontinuity of velocity at a certain point, the corresponding stress has a 1/R singularity. However, for a more realistic circular-slab model, the stress singularity becomes logarithmic. Thus the stress distribution is very sensitive to the boundary conditions, and in evaluating the applicability of viscous models of trench topography it is essential to use realistic geometries. Topography and seismicity data from northern Hoshu, Japan, were used to construct a finite element model, with flow assumed tangent to the top of the grid, for both Newtonian and non-Newtonian flow (power law 3 rheology). Normal stresses at the top of the grid are compared to the observed trench topography and gravity anomalies. There is poor agreement. Purely viscous models of subducting slabies with specified velocity boundary conditions do not predict normal stress patterns compatible with observed topography and gravity. Elasticity and plasticity appear to be important for the subduction process. M.G.

N84-27006# Aeronautical Research Inst. of Sweden, Stockholm.
A FUNDAMENTAL STUDY OF RELATION BETWEEN THE VELOCITY FIELDS FAR UPSTREAM OF, AT AND FAR DOWNSTREAM OF A A ROTOR DISK IN A SHEAR FLOW
B. C. A. Johansson Oct. 1983 98 p refs
(FFA-136) Avail: NTIS HC A05/MF A01

For the analysis of wind turbine low, it would be of great value to find a general relation between the local velocity fields far upstream, at the rotor disk and far downstream of a rotor inducing large perturbations in a shear flow. When the velocity perturbations of a parallel flow are small, the induced velocity at the obstacle causing the perturbation (disk or lifting line) is half the induced velocity far downstream at the same streamline. For a rotor in uniform flow, the mean induced velocity at the disk is also half the mean induced velocity far downstream, even if the perturbation velocities are not small. A first step was taken towards obtaining the desired general relation. A numerical example is calculated, which shows that the ratio one half has no general validity. Results are applicable not only to wind turbines, also to propellers, and helicopter rotors. A.R.H.

N84-27007# Royal Aircraft Establishment, Farnborough (England).
THEORETICAL MODELLING OF THREE-DIMENSIONAL VORTEX FLOWS IN AERODYNAMICS
J. H. B. Smith 1983 24 p refs Presented at the AGARD Fluid Dyn. Panel Symp. Aerodyn. of Vortical Type Flows in Three Dimensions, Rotterdam, 25-28 Apr. 1983
(AD-A134966; RAE-TM-AERO-1963; BR89099) Copyright. Avail: NTIS HC A02/MF A01 CSCL 20/4

A unified account is presented of the various inviscid models used to represent three-dimensional vortex flows in aerodynamics; essentially those relying on vortex sheets and line-vortices. Recent developments in extending the scope, accuracy, and stability of these models are described. An evaluation of their relative strengths and weaknesses suggests that the different models all have continuing roles to play. It is claimed that vortex modelling has come of age, in the sense that we can now learn about the real world from the behavior of models, after decades of trying to make the models conform with reality. M.G.

N84-27008# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
A COMPARISON OF THE TUBE-SIDE PERFORMANCE OF ENHANCED HEAT TRANSFER TUBING FOR NAVAL CONDENSERS M.S. Thesis
Ronald Keith Alexander Dec. 1982 123 p refs
(AD-A126938; NPS69-82-008) Avail: NTIS HC A06/MF A01 CSCL 20/13

The data of several investigators conducting research in the area of enhanced heat transfer in internally ribbed and spirally corrugated tubes is compiled and examined to determine the effects of the geometric characteristics of enhanced tubing on flow resistance and heat transfer. The data are compared to determine if there are any relations, either new or previously published, which can be of use to the designer to predict the friction factor and heat transfer coefficient for a specified enhanced tube. Empirical relations are recommended for friction factor and heat transfer coefficient for single start and multiple start spirally corrugated tubes based on the law of the wall similarity analysis and a heat transfer similarity analysis. The empirical relations are compared to experimental data for single start and multiple start corrugated tubes with pitch to groove ratios greater than 10 and dimensionless groove depths less than 0.05. GRA

N84-27009# Naval Ship Research and Development Center, Bethesda, Md.
MIXING-LENGTH FORMULATIONS FOR TURBULENT BOUNDARY LAYERS OVER ARBITRARILY ROUGH SURFACES Final Report
P. S. Granville Mar. 1984 45 p
(SR0-2301)
(AD-A140560; DTNSRDC-83/102) Avail: NTIS HC A03/MF A01 CSCL 20/4

Mixing lengths are formulated for turbulent boundary layers over arbitrarily rough surfaces from both the van Driest and from the Rotta procedures. The associated eddy viscosities and the associated turbulent kinetic energies and turbulent dissipation rates are also formulated. Author (GRA)

N84-27010# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE BEHAVIOR OF STREAMLINES NEAR SEPARATION POINT AND SEPARATION CRITERION
H. Zhang, L. Lu, and Z. Yu 11 Apr. 1984 15 p Transl. into ENGLISH from Acta Mechanica Sinica (China), no. 3, 1983 p 227-232
(AD-A140649; FTD-ID(RS)T-1926-83) Avail: NTIS HC A02/MF A01 CSCL 20/4

The behavior of streamlines near the separation point and the separation criterion of two dimensional noncompressible steady and unsteady flow were studied. The MRS criterion is necessary when the separation flow has two lines v=o passing through the separation point. For the flow described by boundary layer equations, the separation point is generally a Goldstein singularity and the MRS criterion is generaly equivalent to the singularity criterion. However, the separation point is not a singularity for the Navier-Stokes equations. B.G.

N84-27011# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
A RELATIONSHIP BETWEEN LIQUID ROLL MOMENT AND LIQUID SIDE MOMENT Final Report
C. H. Murphy Apr. 1984 23 p
(DA Proj. 1L1-61102-AH-43)
(AD-A140658; AD-F300413; ARBRL-MR-03347) Avail: NTIS HC A02/MF A01 CSCL 19/1

Spinning projectiles carrying liquid payloads and performing large coning motion have uniformly been observed to experience rapid despin. For linear fluid mechanics, it has been shown that the ratio of the magnitudes of the liquid roll moment to the liquid side moment is the tangent of the coning angle. The validity of this relationship is demonstrated by gyroscope data obtained by M. C. Miller and flight data for twelve projectiles analyzed by R. L. Pope. GRA

N84-27012# Naval Postgraduate School, Monterey, Calif.
FLOW VISUALIZATION STUDY OF NATURAL CONVECTION FROM A HEATED PROTRUSION IN A LIQUID FILLED RECTANGULAR ENCLOSURE M.S. Thesis
R. H. Knock Dec. 1983 70 p
(AD-A140696) Avail: NTIS HC A04/MF A01 CSCL 20/13

A flow visualization study of natural convection in a liquid filled rectangular enclosure with a small heater protruding into it from one vertical wall was conducted. The top and bottom horizontal surfaces of the enclosure were heat exchangers whose temperatures could be varied independently. The fluid in the enclosure was water. The Baker electrochemical technique which utilizes a pH indicator was used for flow visualization. Photographs were taken of the two dimensional flow for three different locations of the heater on the vertical wall. Nusselt numbers for each heater location and for a range of Rayleigh numbers were also determined. Visual results indicate the presence of a dual-cell configuration within the enclosure. There is a buoyancy driven upper cell and a shear driven lower cell. The flow of the upper cell follows the geometry of the enclosure. Though the uncertainty inherent in the experiment was high data calculations suggest a trend that as the heater is raised within the enclosure the Nusselt number decreases. Author (GRA)

N84-27013# Massachusetts Inst. of Tech., Cambridge. Acoustics and Vibration Lab.
MEASUREMENTS OF THE LOW WAVENUMBER WALL PRESSURE SPECTRAL DENSITY DURING TRANSITION ON A FLAT PLATE Technical Report
C. J. Gedney and P. Leehey Apr. 1984 35 p
(Contract N00014-83-K-0227)
(AD-A140753; AV-93019-1) Avail: NTIS HC A03/MF A01 CSCL 20/4

Experimental measurements of the low-Mach number wall pressure spectra density in the transition region are currently carried out in our laboratory. The six element (B&K Model No. 4144) microphone array used by Farabee and Geib was used as the wavenumber filtering apparatus and flush mounted on an open test section identical to that used by Jameson. A technique of conditional sampling on signals was used to determine the characteristics of the transitional flow. The frequency spectrum of the microphone array output was computed for uniform shading, Chebyshev shading and binomial shading. A detailed update on our progress is enclosed. The preliminary results indicate that there is no significant measurable difference in the low wavenumber wall pressure spectrum density for a transitional boundary layer as compared to a fully turbulent boundary layer. Author (GRA)

N84-27014# Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
STUDIES OF HEAT TRANSFER IN COMPLEX INTERNAL FLOWS Final Report, 15 Sep. 1979 - 31 Mar. 1984
E. M. Sparrow Apr. 1984 116 p
(Contract N00014-79-C-0621)
(AD-A140804) Avail: NTIS HC A06/MF A01 CSCL 13/1

This is the final report of a research program whose objective was to determine the heat transfer and pressure drop characteristics of heat exchange devices subject to highly complex fluid flows. The report consists of two parts. The first part summarizes the results of research that has already been described in progress reports, while the second part conveys the results of investigations conducted and completed since the distribution of the last progress report. The general theme which runs through the work is a search for the effects of flow maldistribution on heat transfer in various types of heat exchange devices. The maldistribution may be caused by the turning of the flow upstream of the inlet, abrupt changes of cross-sectional area, blockage, competition between parallel flow passages, misalignment of the inlet and outlet of plenum chambers, swirl, and the presence of enhancement devices. The investigated geometries included tube banks in crossflow, circular tubes, and rectangular flow passages. GRA

N84-27015# Naval Postgraduate School, Monterey, Calif.
HEAT TRANSFER MEASUREMENTS OF INTERNALLY FINNED ROTATING HEAT PIPES M.S. Thesis
A. Nefesoglu Dec. 1983 103 p
(AD-A140847) Avail: NTIS HC A06/MF A01 CSCL 20/13

A rotating cylindrical heat pipe was tested using various internally finned condensers and was compared with a smooth-wall cylinder. Each condenser was tested at rotational speeds of 700, 1400 and 2800 rpm with film condensation. Distilled water was used as the working fluid. The heat transfer rate of each condenser was plotted versus the driving temperature difference between the vapor saturation temperature and the cooling water inlet temperature. The objective of this investigation was to study the performance with various fin configurations and to find an optimum fin geometry. As expected, in all cases, performance was improved with increasing rpm. The performance of internally finned condensers was found to be as much as 230 percent greater than that of the smooth condenser. Author (GRA)

N84-27016# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
SOME THEORETICAL RESULTS ON MACH REFLECTION OF

MODERATELY STRONG SHOCK WAVES
E. Handke and F. Obermeier Dec. 1983 20 p refs Presented at Mach Reflection Symp., Freiburg, 14-16 Jun. 1983
(MPIS-14/1983; ISSN-0436-1199) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,55

The flow field of weak and moderately strong shock waves reflected from a solid wedge was analyzed. Transition from regular reflection to Mach reflection was determined using a generalization of the method of strained coordinates to three or more independent variables. The method accounts for nonlinear interactions between the shock fronts and the flow behind them as well as for diffraction waves caused by the vertex of the wedge. It shows that diffraction effects do not play an essential role for the actual transition from regular reflection to Mach reflection, but that they have an non-negligible effect on the spatial development of the Mach-stem and the trajectory of the confluence of incoming wave, reflected wave, and Mach-stem. A functional relation between the pressure amplitude of the incoming shock wave and its inclination angle, at which the transition from regular reflection to Mach reflection takes place, is derived. Author (ESA)

N84-27017# Karlsruhe Univ. (West Germany). Sonderforschungsbereich 80.
FALSE DIFFUSION IN THREE-DIMENSIONAL STEADY FLOW CALCULATIONS
A. O. Demuren Nov. 1983 19 p refs
(KU-SFB-80/T/224) Avail: NTIS HC A02/MF A01

The three components of the false or numerical diffusivities which result from the use of first-order upwind difference schemes in the calculation of steady three dimensional flows are derived. The effects of the false diffusion are illustrated by comparison of the calculations of the flow of a row of jets in crossflow, using a first-order-accurate upwind scheme with those obtained when a third-order-accurate quadratic upstream-weighted scheme is employed. The latter has no numerical diffusion and produces better agreement with experimental data. It is shown that the two schemes lead to significantly different results when the ratio of the false diffusivity relative to the physical diffusivity is high, and similar results when this ratio is low. Author (ESA)

N84-27018# Bielefeld Univ. (West Germany). Zentrum fuer Interdisziplinaere Forschung.
APPROACH TO EQUILIBRIUM OF A RELATIVISTIC GAS
A. S. Alves (Porto University, Portugal) 1983 33 p refs
Avail: NTIS HC A03/MF A01

The global behavior of a gas in a purely gravitational fields is analyzed using kinetic theory. For stationary space-time it is shown that the entropy cannot increase indefinitely. This implies that the gas steadily approaches equilibrium. The problem of entropy growth is solved by estimating the integral of entropy through the theory of equimeasurable functions. Author (ESA)

N84-27019# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
FUGACITY OF GASEOUS HYDROGEN
H. P. vanLeeuwen Aug. 1983 32 p refs Submitted for publication
(NLR-MP-83038-U) Avail: NTIS HC A03/MF A01

The concept of fugacity is explained. Application of compressibility and fugacity data in hydrogen embrittlement calculations is discussed. Equations of state are reviewed. Compressibility factors and fugacity coefficients are calculated. Author (ESA)

N84-27020# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
A NUMERICAL VIEW ON STRONG VISCOUS-INVISCID INTERACTION
A. E. P. Veldman 12 Aug. 1983 24 p refs Submitted for publication
(NLR-MP-83049-U) Avail: NTIS HC A02/MF A01

The origin of the Goldstein singularity in separated boundary layers is derived numerically. It is shown that the singularity is due to the mathematical way in which the flow equations are treated. Strategies to avoid the singular behavoir are discussed. Analysis of the iterative behavior of these methods reveals a common underlying condition governing their convergence.
Author (ESA)

N84-27021# National Aerospace Lab., Amsterdam (Netherlands). Space and Informatics Div.
UNIAXIAL MODEL FOR GAS-LOADED VARIABLE CONDUCTANCE HEAT PIPE PERFORMANCE; THE EFFECTS OF VAPOR FLOW, FRICTION AND INERTIA
A. A. M. Delil and H. A. M. Daniels 6 Sep. 1983 10 p refs Presented at ESA/CNES Intern. Symp. on Environ. and Thermal Control Systems for Space Vehicles, Toulouse, 3-7 Oct. 1983
(Contract NIVR-1833)
(NLR-MP-83058-U) Avail: NTIS HC A02/MF A01

A uniaxial model for the transient performance of gas-loaded variable conductance heat pipes is described. The model is steady-state and accounts for diffusion at the vapor-gas interface, inertia and friction of the moving vapor, and radial conduction in the wall and wick. Calculations show that: diffusion is negligible; inertial effects are considerable in the operating range characterized by low vapor pressure. Friction, causing velocity increase of subsonic flow, enhances the impact of inertia and widens the operating range. Results of calculations with a flat front model (the uniaxial model in the limit of zero diffusivity) predict performance and controllability figures that considerably differ from those predicted by models which neglect inertia and friction.
Author (ESA)

N84-27022# Bonn Univ. (West Germany). Inst. fuer Angewandte Mathematik.
COMPRESSIBLE FLOWS OF JETS AND CAVITIES
Hans Wilhelm Alt, Luis A. Caffarelli (Chicago Univ.), and Avner Friedman (Northwestern Univ.) Jan. 1984 114 p refs Submitted for publication
(Grants DFG-SFB-72; NSF 74-06375-A01; NSF MCS-79-15171) (Preprint-637) Avail: NTIS HC A06/MF A01

A variational approach to the theory of jets and cavities for compressible fluids is outlined. Existence and uniqueness for axially symmetric jets and existence for axisymmetric cavities of compressible fluids are established. Existence for two dimensional asymmetric jet flows is also established. Two-dimensional symmetric flows are obtained as a special case of the axially symmetric problem. Results on cavities when specialized to incompressible fluids, extend work on infinite cavities to the case where the obstacle is not a monotone curve, and provide simpler proofs.
Author (ESA)

N84-26916# Joint Publications Research Service, Arlington, Va.
MATHEMATICAL MODELING OF TRANSIENT SEPARATION FLOW AROUND CIRCULAR CYLINDER Abstract Only
S. M. Belotserkovskiy, V. N. Kotovskiy, M. I. Nisht, and R. M. Fedorov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 23-24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 138-147 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26921# Joint Publications Research Service, Arlington, Va.
LOGARITHMIC DECREMENT OF OSCILLATIONS OF LOW-VISCOSITY FLUID ROTATING INSIDE CYLINDRICAL VESSEL Abstract Only
N. K. Radyakin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 27 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 85-92 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26924# Joint Publications Research Service, Arlington, Va.
ASYMPTOTIC THEORY OF SEPARATION FLOW Abstract Only
Viktor V. Sychev *In its* USSR Rept.: Eng. and Equipment

(JPRS-UEQ-84-003) 13 Apr. 1984 p 28-29 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 47-54 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26927# Joint Publications Research Service, Arlington, Va.
VORTICAL-POTENTIAL FLOW OF IDEAL FLUID ALONG PLANE WITH DEPRESSION Abstract Only
V. S. Sadovskiy and N. P. Sinitsyna *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 30-31 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 161-163 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26930# Joint Publications Research Service, Arlington, Va.
IMMERSION OF DISK IN COMPRESSIBLE FLUID AT ANGLE TO FREE SURFACE Abstract Only
V. A. Yeroshin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 32-33 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 142-144 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26932# Joint Publications Research Service, Arlington, Va.
REGULAR REFLECTION OF STRONG SHOCK WAVE BY WEDGE SURFACE Abstract Only
V. I. Bogatko and G. A. Kolton *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 34 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 92-96 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26934# Joint Publications Research Service, Arlington, Va.
PASSAGE OF WAVES IN FLUIDS THROUGH DAMPING INTERLAYERS AND THEIR INTERACTION WITH BARRIER Abstract Only
A. G. Lyakhov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 35 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 53-58 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26935# Joint Publications Research Service, Arlington, Va.
EFFECT OF ACOUSTIC PERTURBATIONS ON FLOW STRUCTURE IN BOUNDARY LAYER WITH UNFAVORABLE PRESSURE GRADIENT Abstract Only
A. V. Dovgal and V. V. Kozlov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 36 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 48-52 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26936# Joint Publications Research Service, Arlington, Va.
THREE-DIMENSIONAL TURBULENT BOUNDARY LAYERS AT BIELLIPTICAL BODIES IN STREAM OF COMPRESSIBLE GAS AT SOME ANGLE OF ATTACK Abstract Only
V. A. Aleksin and Yu. D. Shevelev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 36-37 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 39-47 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26938# Joint Publications Research Service, Arlington, Va.
TURBULENT BOUNDARY LAYER AT PLATE WITH SUCTION AT VARIOUS ANGLES Abstract Only
Ye. V. Dunayeva, V. M. Yeroshenko, A. A. Klimov, and V. I. Kondratyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 38 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 27-31 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26939# Joint Publications Research Service, Arlington, Va.
TURBULENT FLOW OF AEROSOL IN ROTATING CHANNELS OF TURBOMACHINES Abstract Only
G. G. Medvedev, M. V. Vasilevskiy, V. N. Kurochkin, and Zh. A. Anisimov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 39 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Energ. i Transport (Moscow), no. 5, May 1983 p 95-100 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-27187# Joint Publications Research Service, Arlington, Va.
GENERALIZED SPECTRA OF SLIGHTLY NONLINEAR ROSSBY WAVES Abstract Only
G. M. Reznik and T. E. Soomere *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 17 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 923-927 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27197# Joint Publications Research Service, Arlington, Va.
SUPERCRITICAL REGIMES IN ROSSBY WAVE PROPAGATION Abstract Only
A. P. Mirabel *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 25-26 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 3-9 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27208# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF VELOCITY ON DEPTH DETERMINED FROM TRAVEL-TIME CURVES OF REFRACTED WAVES IN RANDOMLY INHOMOGENEOUS MEDIA Abstract Only
N. V. Petersen *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 39-40 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 95-100 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27211# Joint Publications Research Service, Arlington, Va.
RAY TRAJECTORIES IN STOCHASTIC MEDIA WITH LINEAR DEPENDENCE OF DETERMINISTIC VELOCITY COMPONENT ON DEPTH Abstract Only
N. V. Petersen and S. M. Golynskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 41-42 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 46-54 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27212# Joint Publications Research Service, Arlington, Va.
SPHERICAL WAVE REFRACTION WITH SHORT DISTANCES OF SOURCE FROM INTERFACE Abstract Only
I. D. Tsvankin, A. V. Kalinin, and B. L. Pivovarov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 42 Transl. into ENGLISH from Izv. Akad. Nauk SR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 32-45 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27222# Joint Publications Research Service, Arlington, Va.
DETERMINING PARAMETERS OF RADIATING FOCUS FROM AMPLITUDE SPECTRA OF BODY WAVES Abstract Only
V. I. Shcheglov and S. I. Isyuk *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 51 Transl. into ENGLISH from Geol. i Geofiz. (USSR), no. 10, Oct. 1983 p 102-106 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27229# Joint Publications Research Service, Arlington, Va.
METHOD FOR EVALUATING PARAMETERS OF MAGNETIZED OBJECT OF GREAT HORIZONTAL EXTENT Abstract Only
M. S. Zeygelman *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 57-58 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, no. 1, Jan. - Feb. 1984 p 85-94 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27236# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF TROPOSPHERIC AEROSOL ON INTEGRAL ALBEDO OF CLOUDY ATMOSPHERE. UNDERLYING SURFACE SYSTEM Abstract Only
T. A. Tarasova and Ye. M. Feygelson *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 69-70 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1161-1166 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27238# Joint Publications Research Service, Arlington, Va.
LIMITING RANGES IN ATMOSPHERIC RADIOACOUSTIC SOUNDING Abstract Only
M. A. Kallistratova and A. I. Kon *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 71 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1267-1271 Original language document was announced as A84-21046 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N84-27023# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
STABILITY DIAGRAMS FOR A RIGID GYROSTAT IN A CIRCULAR ORBIT
P. C. Hughes and D. F. Golla May 1984 59 p refs Sponsored by the Natural Sciences and Engineering Research Council of Canada
(UTIAS-TN-243; ISSN-0082-5263) Avail: NTIS HC A04/MF A01

The dynamics of a rigid gyrostat travelling in a circular orbit are reviewed. The two torques to be balanced are the gyroscopic torque associated with the once per orbit precession of the in plane angular momentum vector, and the gravitational torque that results from the principal inertial axes not being aligned with the orbiting axes. Different methods of balancing these two torques lead to different classes of relative equilibria, viz., the cylindrical case, the conical case, the hyperbolic case, and the general case. The principal contribution is to present a large number of stability diagrams for the many different cases and subcases that arise. A large number of equilbria are, in fact, unstable. However, as shown here, they can usually be stabilized by adding a momentum wheel aligned with the pitch axis. Author

N84-27024*# Pennsylvania State Univ., University Park. Dept. of Physics.
EXPERIMENTAL STUDY USING NEARFIELD ACOUSTICAL HOLOGRAPHY OF SOUND TRANSMISSION FUSELAGE SIDEWALL STRUCTURES Progress Report
J. D. Maynard [1983] 84 p refs
(Grant NAG1-216)
(NASA-CR-173639; NAS 1.26:173639) Avail: NTIS HC A05/MF A01 CSCL 14E

This project involves the development of the Nearfield Acoustic Holography (NAH) technique (in particular its extension from single frequency to wideband noise measurement) and its application in a detailed study of the noise radiation characteristics of several samples of aircraft sidewall panels. With the extensive amount of information provided by the NAH technique, the properties of the sound field radiated by the panels may be correlated with their structure, mounting, and excitation (single frequency or wideband, spatially correlated or uncorrelated, structure-borne). The work accomplished at the beginning of this grant period included: (1) Calibration of the 256 microphone array and test of its accuracy. (2) extension of the facility to permit measurements on wideband noise sources. The extensions incuded the addition of high-speed data acquisition hardware and an array processor, and the development of new software. (3) Installation of motion picture graphics for correlating panel motion with structure, mounting, radiation, etc. (4) Development of new holographic data processing techniques. B.W.

N84-27025*# Infrared Labs., Inc., Tucson, Ariz.
ADVANCED COMPONENTS FOR SPACEBORNE INFRARED ASTRONOMY Final Technical Report
Arnold W. Davidson May 1984 35 p refs
(Contract NAS2-11739)
(NASA-CR-166585; NAS 1.26:166585) Avail: NTIS HC A03/MF A01 CSCL 14B

The need for improved cryogenic components to be used in future spaceborne infrared astronomy missions was identified. Improved low noise cryogenic amplifiers operated with infrared detectors, and better cryogenic actuators and motors with extremely low power dissipation are needed. The feasibility of achieving technological breakthroughs in both of these areas was studied. An improved silicon junction field effect transistor (JFET) could be developed if: (1) high purity silicon; (2) optimum dopants; and (3) very high doping levels are used. The feasibility of a simple stepper motor equipped with superconducting coils is demonstrated by construction of such a device based on a standard commercial motor. It is found that useful levels of torque at immeasurably low power levels were achieved. It is concluded that with modest development and optimization efforts, significant performance gains is possible for both cryogenic preamplifiers and superconducting motors and actuators. E.A.K.

N84-27026# Boeing Co., Seattle, Wash.
LASER BALLISTIC SENSOR DEVELOPMENT
C. R. Pond and P. D. Texeira Aberdeen Proving Ground, Md. Army Armament Research and Development Command Mar. 1984 37 p
(Contract DAAK11-83-C-0001)
(AD-A140427; ARBRL-CR-00526) Avail: NTIS HC A03/MF A01 CSCL 19/4

The results of a series of experiments to measure the yawing motion of a projectile in flight are reported. A laser angular measurement system is used which illuminates a reflector assembly mounted on the projectile. The assembly consists of a special holographic grating and a 6.4 mm cube corner reflector. The assembly generates interference fringes that are used to measure angular position. Test demonstrated that the system survived launch, acquired data, and provided results which agreed with simultaneous ballistic range measurements. Author

N84-27027# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SCANNING PHOTOELECTRIC DEVICES OF SEARCH AND TRACKING
G. P. Katya 19 Aug. 1983 324 p refs Transl. into ENGLISH of the mono. "Skaniruyushchiye Potoelektricheskiye Ustroystva Poiska i Slesheniya" Moscow, Nauka, 1964 p 1-150
(AD-A132566; FTD-ID(RS)T-0374-83) Avail: NTIS HC A14/MF A01 CSCL 20/3

The principles of construction of different photoelectronic scanning systems intended for the search and tracking of selected

regions of a parametric field are examined and analyzed. Primary emphasis was given to the basic components of the scanning devices. Schematic diagrams of scanning equipment are presented. Automatic control of unsteady parametric fields is discussed.
R.S.F.

N84-27028# IIT Research Inst., Chicago, Ill.
AN IMPROVED MSK GENERATOR DIAGNOSTIC UNIT Technical Report, 1983 - 1984
G. L. Nicholas Jan. 1984 26 p
(Contract N00039-84-C-0070)
(AD-A140568; IITRI-E06549-2) Avail: NTIS HC A03/MF A01 CSCL 14/2

The intended use, system design characteristics and operating instructions for a diagnostic unit used with specific MSK Generators are described. The device is intended to allow the MSK Generator user the ability to monitor the output frequency of the generator as well as monitor the several internal frequencies and time intervals on which the output frequency is based. The unit is portable; all power and signal requirements are supplied by the MSK Generator under evaluation. Author (GRA)

N84-27029# National Bureau of Standards, Washington, D.C.
TECHNIQUES IN HIGH-TEMPERATURE RESISTANCE THERMOMETRY. 1: CONSTRUCTION OF THE NBS-DESIGN HIGH TEMPERATURE PLATINUM RESISTANCE THERMOMETER. 2: TOROIDAL RESISTOR FOR HIGH-TEMPERATURE PLATINUM RESISTANCE THERMOMETERS Final Report
N. Bass (CSIRO), J. P. Evans, and S. B. Tillet Jan. 1984 20 p refs
(PB84-164110; NBS-TN-1183) Avail: NTIS HC A02/MF A01 CSCL 14B

High temperature platinum resistance thermometers intended for use as standard interpolating instruments up to the gold point (1064 C) are described which utilize a resistor of reference grade platinum wire wound in a single layer, bifilar helix. The supports and insulators are made of high purity fused silica, and the thermometer incorporates an electrical guard system to minimize the effects of electrical leakage. A toroidal resistor model, also considered, is designed to be easy to make from readily available materials, and it features robustness, small size, and freedom from strain. GRA

N84-27030# National Bureau of Standards, Boulder, Colo. National Engineering Lab.
REFERENCE FLAT PULSE GENERATOR
J. R. Andrews, B. A. Bell, and E. E. Baldwin Oct. 1983 74 p
(PB84-162163; NBS-TN-1067) Avail: NTIS HC A04/MF A01 CSCL 14B

A reference step like pulse generator developed at NBS can be used for accurately characterizing the step response of various kinds of transient recording equipment (oscilloscopes, waveform recorders, transient digitizers, etc.). Basic design principles are given as well as complete circuit diagrams and descriptions. The output stage of the generator is analyzed. Circuit models for developing a time domain computer simulation program using extended SCEPTRE are included. Preliminary specifications indicate that the device provides a negative going reference transition duration (90 to 10 percent) of 600 ps, plus or minus 2 percent after 5 ns. GRA

N84-27031# National Bureau of Standards, Boulder, Colo. Electromagnetic Fields Div.
2.0 GHz TO 4.0 GHz AUTOMATED RADIOMETER OPERATION AND SERVICE MANUAL
George J. Counas Jan. 1984 260 p refs
(PB84-165158; NBSIR-83-1697) Avail: NTIS HC A12/MF A01 CSCL 14B

The 2.0 to 4.0 GHz subsystem of the automated radiometer is described. This section of the multiband automated radiometer is a coaxial total power radiometer which implements a six port reflectometer for impedance characterization and correction and utilizes a newly developed broadband cryogenic noise standard. NBS noise measurement capability in this frequency band was expanded by the addition of this system which adds continuous frequency coverage to existing services along with the capability to measure cryogenic noise sources. GRA

N84-27032# Environmental Monitoring and Support Lab., Cincinnati, Ohio. Environmental Monitoring Div.
LABORATORY EVALUATION OF TUNABLE ATOMIC LINE MOLECULAR SPECTROMETERS FOR BENZENE ANALYSIS Final Report, Dec. 1981 - Dec. 1983
D. R. Scott and R. L. Hedgecoke Apr. 1984 43 p refs
(PB84-177765; EPA-600/4-84-030) Avail: NTIS HC A03/MF A01 CSCL 14B

Two prototype TALMS instruments, one for the laboratory (TALMS 1) and the other for field applications (TALMS 2), were evaluated in the laboratory for performance characteristics in the analysis of benzene using the 253.7 nm mercury line. The tests included detection limit, precision, effect of temperature (TALMS 1), effect of pressure (TALMS) and interferences from organic compounds other than benzene. Both instruments evaluated can detect benzene precisely above the detection limit of 6 microgram. The apparent interferences from toluene and pyridine are relatively small and may be artifacts which can be eliminated with improvements in electronic signal processing. Changes to the sample cell and electronics are recommended to improve the detection limit the capabilities of TALMS to other organic compounds. GRA

N84-26816 Institute TNO for Mechanical Constructions, Delft (Netherlands).
MULTIDIRECTIONAL FORCE AND MOMENT TRANSDUCER
J. P. Mast and H. Wieringa *In its* Multidirectional Force and Moment Transducer Mar. 1983 p 1-12 refs (For primary document see N84-26815 17-31)
Copyright. Avail: Issuing Activity

N84-26817 Institute TNO for Mechanical Constructions, Delft (Netherlands).
PRESSURE COMPENSATED FORCE TRANSDUCER
D. deHaan (Netherlands Institute for Fishery Investigation) and J. P. Mast *In its* Multidirectional Force and Moment Transducer Mar. 1983 p 13-24 refs (For primary document see N84-26815 17-31)
Copyright. Avail: Issuing Activity

N84-26818 Koninklijke/Shell-Laboratorium, Amsterdam (Netherlands).
DEVELOPMENT OF AN INSTRUMENTED RISER JOINT
A. H. vanderKrogt and N. J. vanSoldt *In* Inst. TNO for Mech. Construct. Multidirectional Force and Moment Transducer Mar. 1983 p 25-32 refs Presented at 10th Ann. Offshore Technol. Conf., Houston, 8-11 May 1978 (For primary document see N84-26815 17-31)
Copyright. Avail: Issuing Activity

N84-26876# Joint Publications Research Service, Arlington, Va.
USE OF MICROPROCESSOR TECHNIQUES IN FREQUENCY MEASURING ORGANS Abstract Only
N. S. Gurov and V. N. Chuvychin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 41 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Energ. (Minsk), no. 2, Feb. 1984 p 23-27 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26910# Joint Publications Research Service, Arlington, Va.
MECHANICS OF RIGID GYROSCOPIC SYSTEMS Abstract Only
D. M. Klimov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 18 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 57-65 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26911# Joint Publications Research Service, Arlington, Va.
CONTROL OF QUADRIAXIAL CARDAN SUSPENSION Abstract Only
I. V. Novozhilov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 18 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 66-70 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26912# Joint Publications Research Service, Arlington, Va.
METHOD OF DERIVING EQUATIONS OF MOTION FOR DYNAMICALLY ADJUSTABLE GYROSCOPE Abstract Only
M. Yu. Shatalov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 19 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 3, Mar. 1983 p 12-18 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26913# Joint Publications Research Service, Arlington, Va.
PROBABILISTIC CHARACTERISTICS OF PERTURBATION TORQUES IN GYROSCOPES WITH ELECTROSTATIC SUSPENSION Abstract Only
A. V. Koretskiy and Yu. G. Martynenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 19 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 3, Mar. 1983 p 4-11 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26954# Joint Publications Research Service, Arlington, Va.
ORIENTATION AND CALIBRATION OF THREE-DIMENSIONAL TACHOMETER WITH AID OF AVAILABLE ANGLE DATA Abstract Only
A. I. Tkachenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 49 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 19-23 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-27271*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
SCANNING WIND-VECTOR SCATTEROMETERS WITH TWO PENCIL BEAMS
T. Kirimoto and R. K. Moore *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 89-104 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 14B

N84-27280*# Naval Research Lab., Washington, D. C.
THE DUAL-FREQUENCY SCATTEROMETER REEXAMINED
William J. Plant and A. B. Reeves *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 193-198 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 14B

36 LASERS AND MASERS

Includes parametric amplifiers.

N84-27033 Texas Univ., Dallas.
HIGH POWER FAST PULSE LASERS Ph.D. Thesis
Rasool Sadighi-Bonabi 1983 307 p
Avail: Univ. Microfilms Order No. DA8405900

Nitrogen ion, atomic fluorine and XeF lasers were operated in an oscillator-amplifier configuration. Two synchronously excited plasma were produced by preionized discharges in atmospheric electrical avalanche devices switched by hydrogen thyratrons. The chosen transition of each system from the tube serving as an oscillator was optically delayed and then was threaded through the second discharge. Calibrated attenuation of this beam injected into the amplifier provided data on the overall amplification ratio. From these data effective saturation intensities and small signal gains were found. Based upon these results for the gain and saturation parameters, a self-excited XeF oscillator was designed to be optimized simultaneously for energy density, power density and efficiency. Ten nanosecond pulses of 270 MW/liter with a relative storage efficiency of 1.6% were produced. A fast discharge (low inductance) system with a refined cell and gas handling unit were developed which provided encouraging results concerning the kinetic measurements of He-N2 mixtures. Dissert. Abstr.

N84-27034# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
DEACTIVATION OF HIGHER VIBRATIONAL LEVELS OF HF BY F ATOMS Technical Report
J. F. Bott 23 Apr. 1984 18 p
(Contract F04701-83-C-0084)
(AD-A140853; TR-0084(4603)-3; SD-TR-84-09) Avail: NTIS HC A02/MF A01 CSCL 20/5

The vibrational relaxation times of HF(v = 3) and HF(V = 1) in the presence of F atoms have been measured in a slow-flow fluorescence cell at room temperature. The HF is pumped to vibrational levels v = 1, 2, and 3 by a pulsed HF laser. It was found that F atoms deactivate HF(V = 3) faster than they do HF(v = 1) by a factor of 20.8 + or - 2.0. This dependence of the deactivation rate coefficient on v agrees with that determined for the exothermic V-V or V-R,T deactivation of HF(V = 1 to 3) by N2, O2, D2 and HCl. Author (GRA)

N84-27035# ASULAB S.A., Neuchatel (Switzerland). Groupe Laser Optique.
LASER RANGING TECHNOLOGY FOR SPACE TO SPACE APPLICATIONS. VOLUME 2: HIGH STABILITY CO2-LASER FOR RANGE RATE FINDER DEVELOPMENT OF CRITICAL TECHNOLOGIES
Jul. 1983 39 p refs
(Contracts ESTEC-4681/81/NL-HP(SC); MBB-R3700/2642-R)
(ESA-CR(P)-1877) Avail: NTIS HC A03/MF A01

Frequency stabilization of space applications CO2 lasers was studied. A laboratory model of a frequency stabilized CO2 laser, consisting of a frequency tunable CO2 laser, a frequency reference gas cell, optical means to polarize, expand and couple-out the beam, a beam detector, and frequency control electronics to generate an appropriate error signal to the CO2 laser was developed. Reference gas absorption investigations, laser noise and ripple studies and frequency stabilization experiments were carried out. A short term frequency stability (1 to 10 sec) of - 10 billion limited by laser ripple and by the available measurement method is detected. The long term frequency stability (1 hr) is - 100 million. A concept for a compact, spaceborne CO2 laser system and of suitable frequency stability and linewidth measurement methods is elaborated. Author (ESA)

N84-26870# Joint Publications Research Service, Arlington, Va.
USE OF FIBER LIGHT GUIDES FOR EVALUATION OF PRECISION CHARACTERISTICS OF PULSED LASER RANGE FINDERS Abstract Only
V. P. Danilchenko, V. A. Kashchey, and L. A. Pospelov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 38 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 38-40 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26872# Joint Publications Research Service, Arlington, Va.
PHOTOELECTRIC MASTER MEANS OF MEASUREMENT OF ENERGY AND MAXIMUM POWER OF PULSED LASERS Abstract Only
A. I. Glazov, T. M. Mitrofanov, S. V. Tikhomirov, and V. G. Tyutyunnik *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 39 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 53-55 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26873# Joint Publications Research Service, Arlington, Va.
PRECISION PHOTOMETER FOR MEASUREMENT OF LOW LEVELS OF MAXIMUM POWER OF PULSES LASER RADIATION Abstract Only
V. A. Kostin, V. Ye. Stysin, S. V. Tikhomirov, N. P. Khatyrev, and V. A. Yakovlev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 39 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 55-57 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26875# Joint Publications Research Service, Arlington, Va.
OPTIMUM TIME OF DAY AND NIGHT FOR MEASURING DISTANCES IN TURBULENT ATMOSPHERE WITH OPTICAL RANGE FINDERS (CASE OF HIGH RISE OF LASER BEAM ABOVE GROUND SURFACES) Abstract Only
V. S. Chudnovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 40 Transl. into ENGLISH from Izv. Vyssh Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1307-1308 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-27405# Joint Publications Research Service, Arlington, Va.
RELATIONSHIP BETWEEN CARDIOVASCULAR SYSTEM RESPONSE AND ADRENOCORTICAL GLUCOCORTICOID FUNCTION ON EXPOSURE TO DIFFUSE, LOW-INTENSITY HELIUM-NEON LASER EMISSION
I. N. Ushkova, L. A. Pokrovskaya, G. S. Stepanov, I. M. Suvorov, M. Ye. Kogan, and Ye. F. Grishina *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 42-45 refs Transl. into ENGLISH from Gigyena Tr. i Prof. Zabolevaniya (Moscow), no. 11, 1983 p 47-48 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27406# Joint Publications Research Service, Arlington, Va.
LASER CELL ANALYZER Abstract Only
Z. Z. Latypov and N. O. Skvortsova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 46 Transl. into ENGLISH from Med. Tekhn. (Moscow), no. 6, Nov. - Dec. 1983 p 11-16 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27407# Joint Publications Research Service, Arlington, Va.
HEALTH EDUCATION OF POPULATION IN CONECTION WITH WIDESPREAD USE OF LASER RADIATION Abstract Only
V. A. Kashuba and A. V. Bykhovskiy *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 47 Transl. into ENGLISH from Gigiyena i Sanit. (Moscow), no. 12, Dec. 1983 p 35-37 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27408# Joint Publications Research Service, Arlington, Va.
LASER DOPPLER SPECTROSCOPY OF BIOLOGICAL OBJECTS Abstract Only
Yu. I. Posudin *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 47-48 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 7, Jul. 1983 p 29-37 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27409# Joint Publications Research Service, Arlington, Va.
ACTIVITY OF RESPIRATORY SYSTEM DURING LASER IRRADIATION OF BRAIN STRUCTURES Abstract Only
N. A. Merkulova and L. I. Sergeyeva *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 48-49 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 8, Aug. 1983 p 47-51 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N84-27036# British Library Lending Div., Boston Spa (England).
NATURE OF FORMATION OF STOPPER DEFECT IN HOISTING ROPES
Yu. A. Guryanov, A. A. Fominykh, and I. F. Kalinin 29 Mar. 1984 8 p refs Transl. into ENGLISH from Stal (USSR), no. 7, 1983 p 56-67
(BLL-M-35544-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Analysis of the premature withdrawal of ropes from mining operations because of stopper defect establishes that this defect is caused by the way in which the ropes are employed. Counter-clockwise laid ropes used on the right hand drums of hoisting machines and the reduction of their lay (cast) stresses by dressing enables reduction in the number of cases of ropes withdrawn for stopper defect as well as increase in their overall reserves of accumulated normal use operations. Author

N84-27037 Virginia Polytechnic Inst. and State Univ., Blacksburg.
COMPUTER-AIDED DESIGN OF ROBOTS Ph.D. Thesis
Bartholomew Okechukwu Nnaji 1983 544 p
Avail: Univ. Microfilms Order No. DA8405943

The focus is the component design of a robotic device. To achieve this end, a data base of the structural and ancillary component configurations of a robot was developed. FORTRAN based programs were created to provide design specification, construct a descriptive code for a robot and to access the data structure to select a particular robot. Every possible robot is represented by an array of codes. Each code and its position in the array uniquely define a robot component along with its characteristics. Feasible robotic devices are selected based on work environment/tasks and load. The work environment and tasks are used to obtain the degrees of freedom of the joints and the physical properties of the links. Then, using the information on the links and degrees of freedom, along with load requirements, the joint torques are calculated. Joint drive motors are selected based on the calculated torques. In this fashion, the sensory systems, and end effectors can also be specified and selected.
Dissert. Abstr.

N84-27038 Wisconsin Univ., Madison.
DESIGN OF MECHANICAL JOINTS IN COMPOSITES Ph.D. Thesis
Yung Juei Chiang 1983 231 p
Avail: Univ. Microfilms Order No. DA8400480

Stress and strength analyses of pin loaded holes in mechanical joints in composite materials are presented. The design of mechanical joints in composites depends on several parameters: materials, fastener details, geometry and environmental effects. The literature on the topic is reviewed and the relevant technical problems are outlined. Stress analysis of mechanically fastened joints in linear elastic anisotropic materials is discussed. Many practical problems exist in which nonlinear constitutive behavior supersedes simple linear elastic assumptions. The nonlinear material responses of mechanical joints in composite materials are treated. It is not uncommon for cracks to emanate from fastener holes in high-performance advanced composite structures such as aircrafts. The dependence of variation of stress intensity factors on the concerned parameters is utilized to determine the severity of flaws embedded in the composite at the beginning of service life. Diagrams for stress intensity factors which are useful for design are presented. Dissert. Abstr.

N84-27039 Columbia Univ., New York.
CONTRIBUTIONS TO DYNAMICS STUDY OF AIR-LUBRICATED GAS BEARINGS AT HIGH COMPRESSIBILITY NUMBERS Ph.D. Thesis
Takao Chikazawa 1983 177 p
Avail: Univ. Microfilms Order No. DA8406483

The research concerns transient dynamics of gas lubricated slider bearing operating at very high compressibility numbers. The problem is representative of advanced design concepts of flying head in rotating-disk magnetic memory storage devices. A new computational methodology, based on a convective coordinate system, was developed to treat the gas lubrication theory for the stated conditions. An opto-electronic motion sensing system was demonstrated for the acquisition of corresponding experimental data. Qualitatively consistent correlation between computed results and experimental data was realized. Direct comparisons of computed pressure profiles were compared with known state-of-art computational methods. Very satisfactory agreement was demonstrated with the results obtained by the method of matched asymptotic analysis at conditions for which other methods of computation proved to be not fully dependable. Numerical stability analysis of the new computation algorithm was performed on a linearized model equation using the method of von Neumann characteristic roots. Dissert. Abstr.

N84-27040 Iowa Univ., Iowa City.
COMPUTER-AIDED OPTIMAL DESIGN OF CONSTRAINED DYNAMIC SYSTEMS Ph.D. Thesis
Prakash Krishnaswami 1983 140 p
Avail: Univ. Microfilms Order No. DA8407765

A computer oriented method is developed for optimal design of planar, constrained dynamic systems. The system equations of motion are automatically identified and a minimal set of independent generalized coordinates is identified. A set of differential equations for state sensitivity is obtained by direct differentiation of the equations of motion. These sensitivity equations and the equations of motion are integrated simultaneously to obtain the system response as well as the state sensitivity matrices. The direct differential method for sensitivity analysis is compared with the adjoint variable technique. An optimization package is linked to the analysis/sensitivity algorithm to create a comprehensive optimal design system for constrained dynamic systems. A preprocessor written in the symbolic manipulation language REDUCE-2 is developed for use in implementing the dynamic analysis and design sensitivity algorithms. This preprocessor clearly demonstrates of the potential and feasibility of symbolic computing in computer aided design of dynamic systems. Dissert. Abstr.

N84-27041*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN OF POWER-TRANSMITTING SHIFTS
Stuart H. Loewenthal Jul. 1984 26 p refs Submitted for publication
(NASA-RP-1123; E-1899; NAS 1.61:1123) Avail: NTIS HC A03/MF A01 CSCL 13I

Power transmission shafting which is a vital element of all rotating machinery is discussed. Design methods, based on strength considerations for sizing shafts and axles to withstand both steady and fluctuating loads are summarized. The effects of combined bending, torsional, and axial loads are considered along with many application factors that are known to influence the fatigue strength of shafting materials. Methods are presented to account for variable amplitude loading histories and their influence on limited life designs. The influences of shaft rigidity, materials, and vibration on the design are discussed. E.A.K.

N84-27042*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SPIN ANALYSIS OF CONCENTRATED TRACTION CONTACTS
Stuart H. Loewenthal [1983] 31 p refs To be presented at the 4th Intern. Power Transmission and Gearing Conf., Cambridge, Mass., 8-12 Oct. 1984; sponsored by ASME
(NASA-TM-83713; E-2103; NAS 1.15:83713) Avail: NTIS HC A03/MF A01 CSCL 13I

Spin, the result of a mismatch in contact radii on either side of the point of rolling, has a detrimental effect on traction contact performance. It occurs in concentrated contacts having conical or contoured rolling elements, such as those in traction drives or angular contact bearings, and is responsible for an increase in contact heating and power loss. The kinematics of spin producing contact geometries and the subsequent effect on traction and power loss are investigated. The influence of lubricant traction characteristics and contact geometries that minimize spin are also addressed. Author

N84-27043*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN ANALYSIS OF TRACTION DRIVE TORSIONAL STIFFNESS
Douglas A. Rohn and Stuart H. Loewenthal [1983] 38 p refs To be presented at the 4th Intern. Power Transmission and Gearing Conf., Cambridge, Mass., 8-12 Oct. 1984; sponsored by ASME
(NASA-TM-83712; E-2118; NAS 1.15:83712) Avail: NTIS HC A03/MF A01 CSCL 13I

The tangential compliance of elastic bodies in concentrated contact applied to traction drive elements to determine their torsional stiffness was analyzed. Static loading and rotating conditions are considered. The effects of several design variables are shown. The theoretical torsional stiffness of a fixed ratio multiroller drive is computed and compared to experimental values. It is shown that the torsional compliance of the traction contacts themselves is a relatively small portion of the overall drive system compliance. E.A.K.

N84-27044# Draper (Charles Stark) Lab., Inc., Boston, Mass.
FEEDBACK IN ROBOTICS FOR ASSEMBLY AND MANUFACTURING Final Report, 1 Apr. 1980 - 31 Mar. 1982
Thomas L. DeFazio, Daniel E. Whitney, James L. Nevins, Donald S. Seltzer, Mukund Desai, Eliezer Fogel, Eric F. Junkel, and Bruce K. Walker (MIT) 1983 106 p refs
(Grant NSF DAR-79-18530)
(PB84-177112; R-1563; NSF/MEA-83002) Avail: NTIS HC A06/MF A01 CSCL 13I

The use of multi-axis contact feedback for control of a robot in real time was investigated. Robot operations requiring active feedback for immediate accomplishment or monitoring progress are identified and algorithms employing feedback suitable for generic applications such as assembly, welding, and grinding are developed. Sensor control systems that can monitor, control, and learn from the processes to which they are coupled and which are capable of operating with noisy data and with dynamically varying process models are examined. GRA

N84-27045 Michigan Univ., Ann Arbor.
THE SIMULATION OF DEFORMABLE MECHANICAL SYSTEMS USING VECTOR PROCESSORS Ph.D. Thesis
David Joel Benson 1983 175 p
Avail: Univ. Microfilms Order No. DA8402240

A formulation for simulating systems of deformable bodies undergoing large nonliner motion using vector processors is presented. For algorithms tailored to them, vector processors, such as Cray-1 and Cyber-205, offer better computational rates than scalar processors. The equations of motion in three dimensions are derived from Cauchy's first law of motion by using the finite element method. By introducing an appropriate set of quasi-coordinates and the canonical momenta as variables, arbitrary mechanical systems are represented with a mixture of simple algebraic and first order differential equations. The general formulation is specialized and simplified by representing linearly elastic bodies as truncated series of their vibration modes. A generalized program, named DAVES, for three dimensional problems based on the formulation for linearly elastic and rigid bodies is documented. The program is self formulating in the sense that the equations are automatically generated from a description of the bodies, joints, and applied forces in the system. Numerical solutions are obtained by using Gear's stiff integration method with an explicit Jacobian. Example problems are solved and compared to the solutions in the literature. Dissert. Abstr.

N84-26897# Joint Publications Research Service, Arlington, Va.
IMPROVEMENT OF SURFACE PLANING WITH DIAMOND TOOL Abstract Only
A. A. Mikhaylov, V. V. Pleshakov, V. V. Andrianov, and Yu. N.

Savitskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 6 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 59-61 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26899# Joint Publications Research Service, Arlington, Va.
NOVEL METHOD OF ASSEMBLING LARGE MULTICOMPONENT MACHINE SETS Abstract Only
A. I. Zhabin and M. Ya. Brovman *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 7-8 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 52-55 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26900# Joint Publications Research Service, Arlington, Va.
NOVEL TECHNOLOGICAL SOLUTIONS TO TREATMENT OF THREADS IN MICROMETRIC MEASURING TOOLS Abstract Only
V. V. Matveyev and G. A. Malkov *In its* USSR Rept.: Eng. and Equipment (JpRS-UEQ-84-003) 13 Apr. 1984 p 8 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 55-57 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26901# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF REALIZABILITY OF SELECTIVE MASS TRANSFER DURING FRICTION OF ALUMINUM BRONZES AGAINST STEEL ON COMPOSITION OF LUBRICATING FLUID Abstract Only
I. V. Kragelskiy, L. I. Kuksenova, V. I. Tolokonnikov, A. I. Berdenikov, and L. M. Rybakova *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 9 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 46-47 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26902# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF REALIZABILITY OF SELECTIVE MASS TRANSFER DURING FRICTION OF TIN BRONZES AGAINST STEEL IN HYDRAULIC SYSTEM MECHANISMS ON CONCENTRATION OF ALLOYING ELEMENTS Abstract Only
L. M. Rybakova, L. I. Kuksenova, V. M.. Samylkin, A. I. Berdenikov, and I. V. Kragelskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 9-10 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 44-45 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26903# Joint Publications Research Service, Arlington, Va.
ESTIMATION OF WEAR RATE DURING SELECTIVE MASS TRANSFER Abstract Only
S. A. Polyakov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 10 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 83 p 41-43 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26904# Joint Publications Research Service, Arlington, Va.
ZERO WEAR (SELECTIVE MASS TRANSFER): NEW STEP TOWARD HIGHER WEAR RESISTANCE OF MACHINE PARTS Abstract Only
D. N. Garkunov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 11 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 83 p 36-41 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N84-27046 Wayne State Univ., Detroit, Mich.
THERMAL WAVE IMAGING FOR NON-DESTRUCTIVE EVALUATION OF SUBSURFACE CRACKS IN OPAQUE MATERIALS Ph.D. Thesis
Kenneth Russell Grice 1983 143 p
Avail: Univ. Microfilms Order No. DA8405972

The technique of thermal wave imaging was applied using two approaches to detect subsurface cracks in opaque materials. These two approaches are: (1) the scanning photoacoustic microscopy (SPAM) and (2) the optical deflection of laser probes (MIRAGE). These two approaches were examined and compared in terms of signal magnitude and phase both theoretically and experimentally. The effects of sample crack size, orientation and closure on the thermal wave signal were considered and discussed. Cracks as small as 40 microns in length were detected. Also nearly vertical closed cracks were detected using the MIRAGE technique. As a more difficult test of the thermal wave technique, the feasibility of detecting a fatigue crack on the inner surface of a bolt hole was examined. This experiment represents the first time that a crack on the interior wall of a bolt hole was detected using thermal wave imaging. Dissert. Abstr.

N84-26868# Joint Publications Research Service, Arlington, Va.
ASSURANCE OF UNITY OF TESTS OF SEMICONDUCTOR PRODUCTS Abstract Only
A. V. Yelyutin, L. P. Kholodnyy, R. I. Genkina, and I. P. Kaganovskiy *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 37 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 11-13 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N84-27047 British Library Lending Div., Boston Spa (England).
METHOD FOR SOLVING VARIATION PROBLEMS OF PLASTICITY THEORY
Yu. G. Gulyaev and V. M. Druyan 20 Apr. 1984 6 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chernaya Met. (USSR), v. 7, 1983 p 46-49
(BLL-M-35555-(5828.4)) Avail: British Library Lending Div., Boston Spa, England

A formula for the law of conservation of energy as applied to metal pressure working is given and a notation is obtained for the condition of the minimum of power of shaping the incompressible material in the presence of external body forces and inertial forces. A method is presented for solving variation problems of plasticity theory which can be used for determining the fields of stresses and strains during symmetrical and asymmetrical processes of metal pressure working. Author

N84-27048 Cornell Univ., Ithaca, N.Y.
AN INTEGRATED BOUNDARY ELEMENT ANALYSIS SYSTEM WITH INTERACTIVE COMPUTER GRAPHICS FOR 3-DIMENSIONAL LINEAR-ELASTIC FRACTURE MECHANICS Ph.D. Thesis
Renato Perucchio 1984 244 p
Avail: Univ. Microfilms Order No. DA8407319

The creation of a numerical tool for the solution of general problems in three dimensional linear-elastic fracture mechanics was researched. This is achieved with the integration of boundary element analysis and interactive computer graphic techniques. A library of quadratic, isoparametric surface elements is implemented into a linear-elastic boundary element analysis code designed for virtual memory mini-computer operations. The program incorporates a multidomain analysis capability designed to allow the treatment of domains built up as a sequence of adjacent regions, each having different material properties. An interactive computer graphic system is developed for generating and editing three dimensional meshes for boundary integral element analysis. The surface generation algorithm used for geometric modeling is based on the assumption that the three dimensional region can be subdivided in a series of contiquous subdomains, which, in turn, can be separately described by a set of planar cross sections.
Dissert. Abstr.

N84-27049 Cornell Univ., Ithaca, N.Y.
INTEGRATED ANALYSIS AND DESIGN OF STEEL FRAMES WITH INTERACTIVE COMPUTER GRAPHICS Ph.D. Thesis
Carlos Ignacio PesqueraMorales 1984 307 p
Avail: Univ. Microfilms Order No. DA8407387

An approach is presented for the interactive computer-aided limitstate design of statically loaded steel rigid frames. The objective is to integrate a variety of techniques and tools that will enable an engineer to design two and three dimensional steel rigid frames economically and efficiently. A set of interactive computer graphics programs are developed which permit an engineer to define the structure for analysis and design, to calculate and evaluate the response of the structure to the loads associated with each of the limit states considered, and to re-proportion the structural members. Two strength design procedures were implemented for treating ultimate limit states. One is based on elastic analysis with code-type design equations used to evaluate the response of individual members. The second is based on full nonlinear analysis which considers both geometric and material nonlinearities.
Dissert. Abstr.

N84-27050 Cornell Univ., Ithaca, N.Y.
INFLUENCE OF MICROSTRUCTURE, STRESS-STATE AND ENVIRONMENT ON SUPERPLASTIC FLOW AND FRACTURE IN GLASS-CERAMICS Ph.D. Thesis
John Jiu-Guang Wang 1984 210 p
Avail: Univ. Microfilms Order No. DA8407354

The principles and mechanisms involved in the superplastic forming of Si3N4 based ceramics, SiC based alloys, and the commercially available glass-ceramics were examined. Compressive and tensile tests were performed on model materials, Corning code 9608 and 0329 systems. The remarkable result from the experiments was that strain rates of about 0.0001/s to 0.001/s could be obtained at moderate stresses, about 1 to 10 MPA, at temperatures of about 1400K. In compression, the material was infinitely ductile while in tensile testing, elongation as large as 400% was obtained. Two types of failure mechanisms were investigated: grain boundary cavitation through the polycrystal, and the initiation and propagation of crack(s) from the surface. Three types of experiments were done to differentiate between these two mechanisms: Compression tests, tension tests, and tension tests under biaxial loading were conducted to differentiate between these two mechanisms. Dissert. Abstr.

N84-27051 Iowa Univ., Iowa City.
PLASTIC BEHAVIOR OF 304 STAINLESS STEEL UNDER PLASTIC-STRAIN CONTROLLED LOADING CONDITIONS Ph.D. Thesis
Jen-Che Yao 1983 210 p
Avail: Univ. Microfilms Order No. DA8407799

The plastic behavior of 304 stainless steel under plastic strain controlled loading conditions was investigated in a combined theoretical and experimental program. A MTS axial torsional servo-controlled material testing system and a DEC PDP 11/04 minicomputer were connected to perform a series of computer aided. experiments. The experiments were conducted on 304 stainless steel turbular specimens and the results show that both in phase and out of phase strain paths were successfully controlled. Three plasticity theories, i.e., the improved endochronic plasticity theory, the modified kinematic hardening theory of Drucker and Palgen, and the multisurface theory of Mroz, are used in this investigation for theoretical analysis. Further discussions were made based on plastic strain paths and corresponding stress responses from the constitutive equations of the selected plasticity theories the stress response is unique with respect to a plastic strain path. Several stepwise and sine curve plastic strain paths were used for further demonstration of these points of interest. Dissert. Abstr.

N84-27052 Utah Univ., Salt Lake City.
MATRIX CRACKING IN COMPOSITES AND ITS EFFECTS ON DAMAGED PLY CONSTITUTIVE BEHAVIOR Ph.D. Thesis
Seng Chuan Tan 1983 165 p
Avail: Univ. Microfilms Order No. DA8405921

Modelings of damage growth in composite materials have proceeded primarily at the micromechanics level. Although adding considerably to the understanding of the phenomena, it is difficult to directly include these models in predictions of performance and ultimate failure of composite material structures because of the enormous complexity involved. A new micromechanics model is introduced to describe the initiation and growth of matrix cracking in a ply subjected to general in-plane loading, and its implications to continuum constitutive relations are explored. Modeling of this discretely spaced matrix cracking problem is accomplished using a fracture mechanics approach based on energy considerations in conjunction with an approximate elasticity solution using mixture theory. In addition, a finite element generalized plane strain model was developed. The continuum theory of damaged ply constitutive behavior, the first ply failure problem, and the path dependence of damage growth are discussed. Dissert. Abstr.

N84-27053 Columbia Univ., New York.
THE ROLE OF ANELASTIC STRAIN IN THE CYCLIC CREEP BEHAVIOR OF A PARTICLE STRENGTHENED ALLOY Ph.D. Thesis
Vincent C. Nardone 1983 106 p
Avail: Univ. Microfilms Order No. DA8406530

The elevated temperature cyclic creep behavior of the oxide dispersion strengthened (ODS) nickel base superalloy Inconel MA 6000 was studied. In all cases the load was applied in the form of a square wave, with the time at maximum load being equal to the time at minimum load. The minimum load was the same for all tests being nearly equal to zero. Cyclic creep as defined is load controlled low cycle fatigue, with an R value nearly equal to zero. The effect of varying the temperature, the maximum stress and the frequency of load application were considered in detail. Inconel MA 6000 showed a remarkable cyclic strengthening effect as evidenced by a decrease in the cyclic minimum strain rate and increase in the rupture life relative to static creep. The anelastic relaxation that occurs after removing the load is studied in detail.
Dissert. Abstr.

N84-27054 Cornell Univ., Ithaca, N.Y.
NUMERICAL ANALYSIS OF TIME-DEPENDENT INELASTIC FRACTURE Ph.D. Thesis
Vinod Kumar Banthia 1984 138 p
Avail: Univ. Microfilms Order No. DA8407395

The existing boundary element programs for the analysis of stresses around a stationary crack in a creeping material were modified to incorporate the capabilities of analyzing stresses around elliptic cutouts of any size and around a cutout which is growing in a predetermined fashion. A complete finite element program, having the same capabilities as the boundary element program mentioned above, was also developed. The boundary element program is used to study the fracture mechanics parameter C-Integral. This convenient extension of J-Integral is not path independent. Both methods were evaluated for their ability to model the stress field ahead of a growing crack and the behavior

of a model which models deformation near the crack tip in a more realistic manner than the previously used material models was studied. Both the programs are equally efficient in modelling creep fracture. Because of the nature of discretization used in the two cases, the BEM is more suited for modelling short time response and the FEM is more suited for modelling long time response. The best results can be obtained by using the two methods together - each in its regime of application.
Dissert. Abstr.

N84-27055 Lehigh Univ., Bethlehem, Pa.
THREE-DIMENSIONAL NON-SELF-SIMILAR CRACK GROWTH IN ELASTIC-PLASTIC MATERIALS Ph.D. Thesis
Chih Chen 1984 203 p
Avail: Univ. Microfilms Order No. DA8405645

The three-dimensional elastic-plastic finite element stress analysis is combined with strain energy density criterion to describe the material damage process from crack initiation, slow crack growth, to final instability in medium strength alloys. Both inelastic deformation and crack growth are assumed to occur for each increment of loading such that the redistribution of stresses is accounted for each new crack profile. Specific results are obtained for the center cracked plate configuration with 27 different combinations of specimen thickness, loading step and material type. The fracture toughness for the three different materials are calculated analytically from the unaxial tensile test data. Their values are shown to depend on the yield strength as observed experimentally. Effective strain energy density factor and half crack length are defined so that the results can be compared with their two-dimensional counterparts. Dissert. Abstr.

N84-27056 Georgia Inst. of Tech., Atlanta.
A NEW SECOND ORDER ACCURATE FINITE DIFFERENCE METHOD FOR DYNAMIC RESPONSE OF ELASTIC-PLASTIC FINITE DEFORMATION PROBLEMS Ph.D Thesis
Hsin-Piao Chen 1983 219 p
Avail: Univ. Microfilms Order No. DA8405593

Since the elastic-plastic finite deformation problem is always path-dependent or time-dependent, the response of this problem is most accurately calculated numerically by a step-by-step incremental analysis. A Cauchy stress and an updated Lagrangian approach were chosen to formulate such a problem. In such a formulation, the initially well-arranged meshes distort with increasing time as the body is subjected to finite deformations. By defining some contour difference operators, an optimally stable and second order accurate numerical technique was developed. This finite difference method is suitable for solving problems where the grid system is not fixed but distorts with time. The numerical results were compared with those obtained by a staggered leap-frog scheme with artificial viscosity. Transient dynamic response problems, involving an elastic-plastic-locking material were also solved. The constitutive relationships are nonlinear and the geometry of the problem is axisymmetric. The numerical results reveal the fact that locking material is an effective stress attenuator. Dissert. Abstr.

N84-27057 Lehigh Univ., Bethlehem, Pa.
MATERIAL DAMAGE AND STRUCTURAL INSTABILITY ANALYSIS: LOCAL AND GLOBAL STATIONARY VALUES OF THE STRAIN ENERGY DENSITY FUNCTION Ph.D. Thesis
Ru-Chu Chu 1984 218 p
Avail: Univ. Microfilms Order No. DA8405646

The assessment of material inhomogeneity, on failure instability behavior of a solid is examined. An inclusion of dissimilar material embedded in a matrix is depicted as the analytical model. Analyzed are the influence of loading type, inclusion and plate geometry. The strain energy density theory is applied in conjunction with the finite element approach for analyzing the stability of a given system. This is accomplished by obtaining the location of the global and local relative minima of the strain energy density function. For each problem, there prevails a unique length parameter which reflects the combined effects of load, geometry and material inhomogeneity. The value of I serves as a measure of the degree of failure instability. Information on I is essential for studying the influence of continuum variables with macrostructure of the material. It serves as a measure of material inhomogeneity interacting with load and geometry and provides a quantitative assessment of failure behavior of complex systems. Dissert. Abstr.

N84-27058 Purdue Univ., Lafayette, Ind.
A NEW 48 D.O.F. QUADRILATERAL SHELL ELEMENT WITH VARIABLE-ORDER POLYNOMIAL AND RATIONAL B-SPLINE GEOMETRIES WITH RIGID BODY MODES Ph.D. Thesis
Carleton John Moore 1983 111 p
Avail: Univ. Microfilms Order No. DA8407579

A 48 degree of freedom quadrilateral thin elastic shell finite element using variable order polynomial function, B spline functions, and rational B spline functions to model the shell surface is developed for linear and geometrically nonlinear analyses. This development may allow the stiffness formulation of the shell element to be linked to the geometry data bases created by computer aided design systems. The displacement functions are those of bicubic Hermitian polynomials. The displacement functions and degrees of freedom are expressed and investigated in both the curvilinear and Cartesian forms. The simpler curvilinear form is shown to provide the proper solution for a number of problems such as cylinders, spherical caps, hypars, and oval shells. For certain highly curved shells such as bellows, however, the curvilinear form fails to properly model some rigid body modes even with either the explicit inclusion of rigid body terms or the high order displacement functions. It was found that this difficulty can be circumvented and the rigid body modes can be properly included if a Cartesian form is used for displacement functions.
Dissert. Abstr.

N84-27059 Virginia Polytechnic Inst. and State Univ., Blacksburg.
THE STRESS DISTRIBUTION IN PIN-LOADED ORTHOTROPIC PLATES Ph.D. Thesis
Eric Carl Klang 1983 172 p
Avail: Univ. Microfilms Order No. DA8406626

The performance of mechanically fastened composite joints was studied. Specifically, a single-bolt connector was modeled as a pin-loaded, infinite plate. The geometrically nonlinear, nonconservative nature of the problem became tractable with this model and the effects of several parameters were studied. The algorithm that was developed used two dimensional, complex variable, elasticity techniques combined with a boundary collocation procedure to produce solutions for the problem. Conclusions indicate: (1) the material properties of the plate alter the stress state and, for highly orthotropic materials, the contact stress deviates greatly from the sinusoidal distribution often assumed; (2) friction plays a major role in the distribution of stresses in the plate; (3) reversing the load direction also greatly effects the stress distribution in the plate; (4) clearance (or interference) fits change the contact angle and thus the location of the peak hoop stress; and (5) a rigid pin appears to be a good assumption for typical material systems. Dissert. Abstr.

N84-27060 Arizona Univ., Tucson.
A TRIANGULAR ANISTROPIC THIN SHELL ELEMENT BASED ON DISCRETE KIRCHOFF THEORY Ph.D. Thesis
Subbaiah Sridhara Murthy 1983 231 p
Avail: Univ. Microfilms Order No. DA8405505

Problems associated with finite element analysis of laminated composite thin-shell structures are presented. The specific objective was to develop a thin shell finite element to model the linear elastic behavior of these shells, which would be efficient and simple to use by the practicing engineer. A detailed discussion of the issues associated with the development of thin shell element was presented. The problems encountered with formulation of these elements stem from the need for satisfaction of the interelement normal slope continuity and the rigid body displacement condition by the assumed displacement functions. These difficulties were surmounted by recourse to the discrete Kirchhoff theory approach and an isoparametric representation of the shell middle surface. A detailed derivation of the strain energy density in a thin laminated

composite shell, based on a linear shear deformation theory formulated in a general curvilinear coordinate system, was presented. The DKT approach in conjunction with isoparametric representation results in a simple and efficient thin shell element. Dissert. Abstr.

N84-27061 Toledo Univ., Ohio.
A STUDY OF THE STIFFENED TUBULAR JOINTS USING FINITE ELEMENT METHOD Ph.D. Thesis
Adel M. Sadik 1983 1454 p
Avail: Univ. Microfilms Order No. DA8406616

An implementation of the finite element method to the analysis of stiffened tubular joints is presented. The concept of subdivision of a structure into a number of substructures is presented. The principles of substructure analysis are summarized and related to the conventional matrix method. The potential benefits of substructure application in reducing problem formulation and increasing analytical flexibility are described. The tubular joint investigated had a gusset plate welded to the surface of the main member. The secondary members are assumed to be welded to the gusset plate only and not interwelded to each other nor to the main member. The cylindrical shell (main member) is idealized by a ring element with ten degrees of freedom. The strain-displacement relationships used in the formulation include the effects of transverse shear deformations. The gusset plate is idealized by a rectangular or triangular plane stress element with eight or six degrees of freedom respectively. This analysis is performed with the assumption that the gusset plate is elastic. Dissert. Abstr.

N84-27062 Arizona Univ., Tucson.
POST-BUCKLING BEHAVIOR OF ELASTIC FRAME STRUCTURES Ph.D. Thesis
Myoung Gyou Jin 1983 145 p
Avail: Univ. Microfilms Order No. DA8405500

A useful tool for the investigation of the behavior of three-dimensional elastic frame structures undergoing large deformations and large rotations is developed using a mini-computer with an attached array processor. An updated Lagrangian finite element formulation is established by employing conventional two node-twelve degree of freedom beam elements. In order to trace the pre- and post-buckling equilibrium path, an improved nonlinear solution procedure is proposed. The software is designed to make it possible to solve large-scale problems on a mini-computer by adopting a hypermatrix scheme and the segmentation into a number of processors which are independent programs. The software is simulated to estimate the performance of the software on a combined mini-computer/array processor system. By using the simulator time measurements are performed for three different cases of large-scale three-dimensional frame structure models, which verify the usefulness of the array processor in the solution of nonlinear finite element structural problems. With the use of the hypermatrix scheme, an alternative solution algorithm for system of linear equations is proposed. Dissert. Abstr.

N84-27063 Kansas State Univ., Manhattan.
STRENGTH OF COMPOSITE BEAMS WITH ECCENTRIC, REINFORCED, RECTANGULAR WEB OPENINGS Ph.D. Thesis
Ali Mohammad Momeni 1983 164 p
Avail: Univ. Microfilms Order No. DA8407681

An analytical model was presented to predict the ultimate strength of composite beams with eccentric, reinforced, rectangular web openings. The validity of the model was confirmed by comparing it with the available experimental tests. A parametric study was conducted to examine the effects of varying the opening length, opening eccentricity, steel and concrete strengths, slab thickness, and web stiffeners on the strength of composite beams with web openings. Based on the exact method of solution, an approximate method of analysis in the form of a bilinear moment-shear interaction diagram was introduced to aid designers and engineers in analyzing and designing composite beams with eccentric, reinforced, rectangular web openings. The ultimate strength prediction by the approximate method is more conservative than the exact method; however, the moment-shear interaction diagrams of the two methods are very close. Dissert. Abstr.

N84-27064 California Univ., Davis.
APPLICATION OF MICROPOLAR ELASTICITY TO THE FINITE ELEMENT CONTINUUM ANALYSIS OF ARTICULATED STRUCTURES Ph.D. Thesis
Kenneth James Perano 1983 189 p
Avail: Univ. Microfilms Order No. 8407922

The micropolar theory of elasticity is shown to be capable of accurately modeling the static behavior of a wide class of articulated structures having regular geometries. A technique for determining the material properties of the equivalent continuum which most closely models the behavior of a structural system of discrete members is presented. The micropolar material properties are expressed explicitly in terms of the geometry of the structure, and the material and geometric constants of the constituent members. Finally, the powerful and versatile finite element method is used to analyze the resulting continuum. Continuum modelling of a discrete structure offers a practical versatile, and economical alternative to traditional matrix structural analysis techniques. The node points of the elements chosen for the finite element continuum analysis need not coincide with the joints of the actual structure, thus allowing one continuum element to span several discrete elements and enabling substantial reductions in the cost of an analysis. Dissert. Abstr.

N84-27065*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANALYSIS OF LATERAL AND TORSIONAL VIBRATION CHARACTERISTICS OF BEAMS AND SHAFTS WITH END LOCATED ROTATIONAL MASSES
Daniel K. Robertson May 1984 33 p refs
(NASA-TM-84593; NAS 1.15:84593) Avail: NTIS HC A03/MF A01 CSCL 20K

Partial differential equations are derived for free lateral and torsional vibration of a uniform free-free beam with a rotational mass attached to each extremity. For appropriate boundary conditions, nonlinear algebraic equations are obtained using a symbolic manipulation computer program, the solutions of which enable the computation of the neutral frequencies and mode-shapes. The mode-shapes are linear combinations of trigonometric and hyperbolic sine and cosine functions. A computer program is written for the numerical solution of the algebraic equations mentioned above, which can compute the natural frequencies, mode-shapes, and node points for any given set of parameters, for any given number of modes. Author

N84-27066*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRESS DECAY IN AN ORTHOTROPIC HALF-PLANE UNDER SELF-EQUILIBRATING SINUSOIDAL LOADING
W. B. Fichter May 1984 19 p refs
(NASA-TM-85791; NAS 1.15:85791) Avail: NTIS HC A02/MF A01 CSCL 20K

An elastic orthotropic half-plane subjected to sinusoidal normal loading along an entire straight edge is analyzed. Stresses are calculated for material property combinations which are representative of some unidirectional fiber reinforced composites and of (+ or - 45) (subs) laminates made from the same unidirectional materials. Plots of the stresses as functions of the distance from the loaded boundary show that they can differ greatly from their counterparts in the isotropic half-plane under the same loading. How the results impact the question of the applicability of St. Venant's principle to orthotropic materials is briefly discussed. Author

N84-27067# Teledyne Engineering Services, Waltham, Mass. Ship Structure Committee.
FATIGUE CONSIDERATIONS IN VIEW OF MEASURED LOAD SPECTRA Final Report
W. G. Dobson, R. F. Brodrick, J. W. Wheaton, J. Giannotti, and K. A. Stambaugh 1983 48 p refs

(Contract DOT-CG-80359-A)
(AD-A140221; SSC-315; Rept-3049-4) Avail: NTIS HC A03/MF A01 CSCL 20/11

Crack propagation in HY-80 and CS ship steel under typical ship loading time-histories was studied. The loading histories were selected from recorded service stress data which were generated during voyages by the SL-7 containership. Samples of the data were imposed on laboratory specimens as a tape loop signal speeded up by a factor of 25. Analysis of the results indicated that the crack growth during this random loading compared closely with that of constant-amplitude loading if the stress intensity range were expressed as the root-mean-square. It was also determined that significant crack growth, retardation effects were present and that omission of low-amplitude high-frequency components of the loading had little effect on the time rate of growth of cracks. The potentially large effects of environment on crack growth rate were recognized but were not included in the scope of this work.Author

N84-27068# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering.
FINITE ELEMENT ANALYSIS OF BONDED JOINTS M.S. Thesis
B. M. Barthelemy, M. P. Kamat, and H. F. Brinson Apr. 1984 153 p
(Contract N00014-82-K-0185)
(AD-A140559; VPI-E-84-15) Avail: NTIS HC A08/MF A01 CSCL 12/1

A finite element program called STAP was modified for use. Specifically, an eight noded isoparametric element and a non-linear material law was integrated with the STAP program. Details of the element formulation and material law are included. The finite element program was used to analyze a single-lap joint. The results are compared with the closed-form solution due to Goland and Reissner. The finite element analysis of this type of adhesive joint is also compared with experimental data. Another single-lap geometry was analyzed using the finite element program, and the results are compared with two preceding analyses due to Nagaraja and Alwar, and Botha. The thick-adherend and crack-lap adhesive joints are also studied using both linear and non-linear material laws. Some of the results for the thick-adherend specimen are also compared with the Botha analysis. Author (GRA)

N84-27069# Forest Products Lab., Madison, Wis.
EFFECT OF MECHANICAL STRESS ON THE DIELECTRIC PROPERTIES OF WOOD
W. L. James Apr. 1984 20 p
(AD-A140608) Avail: NTIS HC A02/MF A01 CSCL 11/12

The effect of mechanical stress parallel to the electric field on the polarizability (dielectric constant) and equivalent parallel conductance of wood was studied as a possible means for monitoring drying stresses. For electric and mechanical stress parallel to the grain, the effect was observable in wood that was moisture equilibrated at 65 percent relative humidity or greater, but was rather small and variable and drifted considerably with time. For stresses perpendicular to the grain, the effect was nearly nonexistent when the mechanical stress was no greater than the proportional limit. The effect also was essentially nonexistent for wood at moisture content lower than about 7%. The effect was generally larger at lower frequencies and was practically negligible at frequencies as high as 100 kHz. These results indicate that dielectric measurements are not feasible as a measure of mechanical stress in wood. GRA

N84-27070# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
PRELIMINARY EVALUATION OF WAVEGUIDE VIBRATION ABSORBERS Final Report, May 1983 - Jan. 1984
E. E. Ungar and L. G. Kurzweil Wright-Patterson AFB, Ohio AFWAL Jan. 1984 58 p
(Contract F33615-83-C-3217; AF Proj. 2401)
(AD-A140743; BBN-5527; AFWAL-TR-83-3125) Avail: NTIS HC A04/MF A01 CSCL 20/11

The loss factor contribution provided to a vibrating structure by an attached energy-absorbing system is analyzed in terms of the mechanical impedances of the structure and attached system. The driving-point impedance of an exponentially tapered semi-infinite beam is derived and is used to determine the parameters that govern the energy-absorption characteristics of flexural waveguide absorbers. Impedances measured on several preliminary candidate absorber configurations are reported, together with the loss factor contributions they provided for an experimental plate. Although these configurations were found not to exhibit the desired waveguide behavior, their measured loss factor contributions were found to be in good agreement with those predicted from their measured impedances. It is concluded that flexural waveguide absorbers indeed have the potential for providing significant damping, but in order to achieve this effect, they must be impedance-matched to the structure that is to be damped, and absorber configurations need to be developed that exhibit the desired waveguide behavior in the frequency range of concern. Author (GRA)

N84-27071# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
A MATERIAL MODEL FOR REVERSE YIELDING AND ITS APPLICATION TO TORSION Final Technical Report
P. C. T. Chen Mar. 1984 18 p
(AD-A140897; ARLCB-TR-84005) Avail: NTIS HC A02/MF A01 CSCL 12/1

A theoretical model for reverse yielding is proposed with an attempt to give a better representation for some material such as a high strength steel. The Bauschinger effect factor is treated as a function of overstrain. The strain-hardening effect is taken into account with different parameters used for forward and reversed loading processes. The application of this model to the torsion problem in a cylindrical bar is shown. Author (GRA)

N84-27072# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
STATISTICS OF CRACK GROWTH IN ENGINE MATERIALS. VOLUME 2: SPECTRUM LOADING AND ADVANCED TECHNIQUES Final Report, 15 Jan. 1981 - 30 Nov. 1982
B. J. Schwartz, C. G. Annis, Jr., G. C. Salivar, and J. N. Yang Wright-Patterson AFB, Ohio AFWAL Feb. 1984 101 p
(AF Proj. 2420)
(AD-A140920; PWA/GPD/FR-16727-Vol-2; AFWAL-TR-82-4040-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 12/1

A method is developed capable of incorporating the scatter observed in crack growth data into component residual life analyses, such as used in damage-tolerant and retirement-for-cause concepts. Two fracture mechanics-based statistical models for fatigue crack growth damage accumulation in engine materials are proposed. These are based on synergistic fracture mechanics models: a hyperbolic sine crack growth rate function and a linear crack growth rate function of the Paris type. GRA

N84-27073# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
THE K-DISTRIBUTIONS EXTRAPOLATED ON THE BASIS OF STRESS INTENSITY RATES
A. U. deKoning and C. J. Lof 12 Aug. 1983 13 p ref Presented at 3rd Conf. on Numerical Methods in Fracture Mech., Swansea, United Kingdom, 26-30 Mar. 1984
(NLR-MP-83048-U) Avail: NTIS HC A02/MF A01

A stiffness derivative technique to efficiently calculate values for stress intensity rates is proposed. The finite element formulation is discussed. Applicability of the method is demonstrated for a corner crack at an unloaded hole. The results compare well with results obtained in successive finite element calculations using a very detailed mesh. Author (ESA)

N84-27074# Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
GENERATION OF MARKER LINES BY MEANS OF MARKER LOADS
K. Hoffer and R. Hillbrecht 1984 13 p

Avail: NTIS HC A02/MF A01

Flight simulation crack propagation tests were run on flat specimens to show that it is possible to generate marker lines on the fatigue fracture surface. The marker lines are clearly visible. A comparison of results obtained from crack propagation tests shows the constant amplitude loads interspersed in the FALSTAFF flight-by-flight loads to be damage equivalent to the flights not simulated in the flight-by-flight sequence. Author (ESA)

N84-27075# Illinois Univ., Chicago. Dept. of Theoretical and Applied Mechanics.
STRESS ANALYSIS OF WIRE HOIST ROPE Progress Report, 7 Jan. 1980 - 30 Sep. 1983
30 Sep. 1983 104 p refs
(Contract DI-BM-J0100011)
(PB84-172618; BM-OFR-50-84) Avail: NTIS HC A06/MF A01 CSCL 08I

The static and dynamic response of wire rope in deep shaft mining operations were theoretically analyzed. Expressions for the stresses in the individual wires of complex wire ropes are derived, and specific results for simple strands are presented for the case of ropes subjected to a combination of axial loading and bending over a sheave. Dynamic overloading associated with certain mining operations, such as dumping ore into a suspended skip and accelerating a fully loaded skip upward are considered. Experiments to determine the axial stiffness of wire rope are described. Factors affecting the service life of wire rope, such as residual stresses, contact stresses, and fatigue behavior, are discussed. Specific research areas in need of further investigation are identified. GRA

N84-26610# Naval Research Lab., Washington, D. C.
THE EFFECTS OF MOISTURE ON FRACTURE TOUGHNESS AND THERMAL RELAXATION OF STRETCHED ACRYLIC PLASTICS
J. Tirosh, S. A. Sutton, P. W. Mast, R. W. Thomas, and I. Wolock *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 275-295 (For primary document see N84-26596 17-01)
(AD-P003197) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26611# National Research Council of Canada, Ottawa (Ontario).
COMPARISON OF BULLET RESISTANCE OF NEW AND AGED POLYCARBONATE
J. B. R. Heath, R. W. Gould, and E. B. Stimson *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 296-337 (For primary document see N84-26596 17-01)
(AD-P003198) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26613# Boeing Commercial Airplane Co., Seattle, Wash.
AN INDUSTRY TEST PROGRAM FOR INTERLAYER EQUIVALENCY
P. H. Bain *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 382-406 (For primary document see N84-26596 17-01)
(AD-P003200) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26622# Measurements Group, Inc., Raleigh, N.C.
MEASUREMENT OF RESIDUAL STRAINS AND STRESSES IN TRANSPARENT MATERIALS
A. S. Redner and T. W. Corby, Jr. *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 570-580 (For primary document see N84-26596 17-01)
(AD-P003209) Avail: NTIS HC A08/MF A01 CSCL 11/9

N84-26624# Boeing Commercial Airplane Co., Seattle, Wash.
THE NEED FOR APPLICATION OF DYNAMIC MECHANICAL ANALYSIS IN THE EVALUATION OF INTERLAYER MATERIALS
A. Jayarajan *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 597-618 (For primary document see N84-26596 17-01)
(AD-P003211) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26633# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
A TRIANGULATION TECHNIQUE FOR OBTAINING DEFLECTIONS OF AIRCRAFT TRANSPARENCIES DURING BIRD IMPACT TESTING
W. R. Pinnell and D. A. Crocker *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 776-791 (For primary document see N84-26596 17-01)
(AD-P003220) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26642# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
VALIDATION OF THE MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS) COMPUTER PROGRAM FOR NONLINEAR FINITE ELEMENT ANALYSIS OF AIRCRAFT TRANSPARENCY BIRD IMPACT
R. E. McCarty and J. L. Hart *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 921-972 (For primary document see N84-26596 17-01)
(AD-P003229) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26645# Dayton Univ., Ohio.
PARAMETRIC STUDIES OF THE T-38 STUDENT WINDSHIELD USING THE FINITE ELEMENT OF CODE MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS)
R. Nash *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1040-1055 (For primary document see N84-26596 17-01)
(Contracts F33615-76-C-3103; F33615-80-C-3401)
(AD-P003232) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26646# Dayton Univ., Ohio.
CURRENT PROBLEMS AND PROGRESS IN TRANSPARENCY IMPACT ANALYSIS
R. A. Brockman *In its* Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1057-1082 (For primary document see N84-26596 17-01)
(AD-P003233) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26647# Goodyear Aerospace Corp., Litchfield Park, Ariz.
NASTRAN ANALYSIS OF NUCLEAR EFFECTS ON HELICOPTER TRANSPARENCIES
P. T. Lin and J. S. Jorgenson *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1083-1095 (For primary document see N84-26596 17-01)
(AD-P003234) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26649# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.
STATUS OF NEW AEROTHERMODYNAMIC ANALYSIS TOOL FOR HIGH-TEMPERATURE RESISTANT TRANSPARENCIES
M. O. Varner and C. A. Babish *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1132-1157 (For primary document see N84-26596 17-01)
(Contract F33615-81-C-3412)
(AD-P003236) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26895# Joint Publications Research Service, Arlington, Va.
UTILIZATION OF SELECTIVE MASS TRANSFER FOR INCREASING PERFORMANCE CAPABILITY OF HINGES SUBJECT TO HEAVY LOADS Abstract Only
D. G. Gromakovskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 7 Transl. into ENGLISH from Vestn. Mash. (Moscow), no. 4, Apr. 1983 p 48-50 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26940# Joint Publications Research Service, Arlington, Va.
VIBRATIONS OF AND RADIATION FROM SHELL OF REVOLUTION UNDER HOOP LOAD Abstract Only

D. G. Vasilyev and A. L. Goldenveyzer *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 40 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 184-193 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26943# Joint Publications Research Service, Arlington, Va.
SUBHARMONIC VIBRATIONS OF ROTOR MOUNTED IN ROLLING BEARINGS Abstract Only
A. V. Movchan and V. V. Filatov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 42 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 77-80 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26947# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL STUDY OF BEHAVIOR OF CYLINDRICAL SHELLS WITH LUMPED MASSES UNDER DYNAMIC EXTERNAL PRESSURE Abstract Only
L. V. Andreyev, A. V. Antsiferov, O. M. Dubovik, and I. D. Pavlenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 44-45 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 187-191 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26948# Joint Publications Research Service, Arlington, Va.
EFFECT OF PRESSURE WAVE ON CYLINDRICAL SANDWICH SHELL IMMERSED IN COMPRESSIBLE FLUID Abstract Only
V. I. Pozhuyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 45 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 157-165 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26950# Joint Publications Research Service, Arlington, Va.
THREE-DIMENSIONAL STRESSED STATE OF LONGITUDINALLY CORRUGATED ELASTIC CYLINDERS Abstract Only
Yu. N. Nemish and D. I. Chernopiskiy *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 46-47 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 3, Mar. 1983 p 55-62 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26951# Joint Publications Research Service, Arlington, Va.
ELASTOPLASTIC DOUBLE-WALL SHELLS UNDER INTRICATE NONISOTHERMAL LOAD Abstract Only
B. Ye. Sivchikov and I. N. Sokolova *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 47 Transl. into ENGLISH from Probl. Prochnosti (Kiev), no. 7, Jul. 1983 p 106-109 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26952# Joint Publications Research Service, Arlington, Va.
STRESSED AND STRAINED STATE OF CYLINDRICAL SHELLS REINFORCED WITH HOOPS Abstract Only
A. P. Tatarinov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 48 Transl. into ENGLISH from Probl. Prochnosti (Kiev), no. 7, Jul. 1983 p 102-106 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26953# Joint Publications Research Service, Arlington, Va.
RESIDUAL STRESSES IN LONG DOUBLE-LAYER CYLINDER UNDER NONSTEADY COOLING Abstract Only
V. Ya. Belousov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 48 Transl. into ENGLISH from Probl. Prochnosti (Kiev), no. 7, Jul. 1983 p 98-101 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

42 GEOSCIENCES (GENERAL)

N84-27076*# International Council of Scientific Unions, Urbana, Ill.
MIDDLE ATMOSPHERE PROGRAM. HANDBOOK FOR MAP, VOLUME 9
S. A. Bowhill, ed. (Illinois Univ., Urbana) and Belva Edwards, ed. Dec. 1983 594 p refs Proc. of the URSI/SCOSTEP Workshop on Technical Aspects of MST Radar, Urbana, Ill., 23-27 May 1983 Sponsored in part by UNESCO
(Contract NASw-3805)
(NASA-CR-173439; NAS 1.26:173439; MAP-Handbook-9) Avail: NTIS HC A99/MF A01 CSCL 04B

The term Mesosphere-Stratosphere-Troposphere radar (MST) was invented to describe the use of a high power radar transmitter together with a large vertically, or near vertically, pointing antenna to study the dynamics and structure of the atmosphere from about 10 to 100 km, using the very weak coherently scattered radiation returned from small scale irregularities in refractive index. Nine topics were addressed including: meteorological and dynamic requirements for MST radar networks; interpretation of radar returns for clear air; techniques for the measurement of horizontal and vertical velocities; techniques for studying gravity waves and turbulence; capabilities and limitations of existing MST radar; design considerations for high power VHF radar transceivers; optimum radar antenna configurations; and data analysis techniques. For individual titles, see N84-27077 through N84-27175.

N84-27077*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
THE MST RADAR TECHNIQUE: REQUIREMENTS FOR OPERATIONAL WEATHER FORECASTING c47
M. F. Larsen *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 3-11 refs (For primary document see N84-27076 17-42)
(Grant AF-AFOSR-0100-83)
Avail: NTIS HC A99/MF A01 CSCL 04B

There is a feeling that the accuracy of mesoscale forecasts for spatial scales of less than 1000 km and time scales of less than 12 hours can be improved significantly if resources are applied to the problem in an intensive effort over the next decade. Since the most dangerous and damaging types of weather occur at these scales, there are major advantages to be gained if such a program is successful. The interest in improving short term forecasting is evident. The technology at the present time is sufficiently developed, both in terms of new observing systems and the computing power to handle the observations, to warrant an intensive effort to improve stormscale forecasting. An assessment of the extent to which the so-called MST radar technique fulfills the requirements for an operational mesoscale observing network is reviewed and the extent to which improvements in various types of forecasting could be expected if such a network is put into operation are delineated. B.G.

N84-27078*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
JET STREAM RELATED OBSERVATIONS BY MST RADARS c47
K. S. Gage *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 12-21 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

An overview of the jet stream and its observation by MST radar is presented. The climatology and synoptic and mesoscale structure of jet streams is briefly reviewed. MST radar observations of jet stream winds, and associated waves and turbulence are then considered. The possibility of using a network of ST radars to track jet stream winds in near real time is explored. Author

N84-27079*# Boston Coll., Chestnut Hill, Mass. Dept. of Physics.

MST RADAR DETECTION OF MIDDLE ATMOSPHERE TIDES c46

J. M. Forbes *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 22-29 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-81-13078)
Avail: NTIS HC A99/MF A01 CSCL 04A

Meteorological and dynamical requirements pertaining to the specification of middle atmosphere tides by the MST radar technique are outlined. Major issues addressed include: (1) the extraction of tidal information from measurements covering a fraction of a day; (2) the ramifications of transient effects (tidal variability) on the determination and interpretation of tides; (3) required temporal and spatial resolutions and; (4) global distributions of MST radars, so as to complement existing MST, meteor wind, and partial reflection drift radar locations. Author

N84-27080*# Colorado Univ., Boulder. Cooperative Inst. for Research in Environmental Science.
METEOROLOGICAL AND DYNAMICAL REQUIREMENTS FOR MST RADAR NETWORKS: WAVES c46

S. K. Avery *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 30-33 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

Studies of wave motions using the MST radar have concentrated on single station time series analyses of gravity waves and tides. Since these radars collect high time resolution data they have the potential to become a significant tool for mesoscale research. In addition, radars are operated almost continuously unattended and, consequently, data sets are available for analyzing longer period wave motions such as tides and planetary scale waves. Although there is much to learn from single station data, the possibilities of new knowledge from a network of radars is exciting. The scales of wave motions in the atmosphere cover a broad range. Consequently the choice of a radar network depends to a large extent on the types of wave motions that are studied. There are many outstanding research problems that would benefit from observations from a MST radar network. In particular, there is a strong need for measurements of gravity wave parameters and equatorial wave motions. Some of the current problems in wave dynamics are discussed. B.G.

N84-27081*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
RADAR OBSERVATIONS OF INERTIAL PERIOD WAVES IN THE LOWER STRATOSPHERE OVER ARECIBO Abstract Only c46

C. R. Cornish and M. F. Larsen *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 34 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

Several hundred hours of wind velocity measurements made with the Arecibo 430-MHz radar during the past few years have indicated the presence of persistent wave like structures just above the tropopause. To further investigate these structures, a nearly continuous times series of wind measurements in the upper troposphere and lower stratosphere was made from May 5 to May 12, 1982 at Arecibo. Each of 16 compass points was sampled as the 430-MHz feed was rotated in a velocity azimuth display (VAD) mode at a zenith angle of 15 degrees off-vertical. Using a nonlinear least squares parameter estimation technique line of sight velocities were calculated from Doppler shifts of the received spectra. These velocities were reduced to zonal and meridional components of the wind vector; the vertical component of the wind vector will be available after further reduction. Author

N84-27082*# Illinois Univ., Urbana. Dept. of Atmospheric Sciences.
BAROCLINIC INSTABILITY IN THE STRATOSPHERE AND MESOSPHERE Abstract Only c46

K.-S. Zhang and T. Sasamori *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 35 Submitted for publication (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

The energy source of stratospheric planetary waves is largely due to vertical propagation from the troposphere, but the stratospheric zonal mean state which changes with time is not stable against small perturbations, whereby transient perturbation waves are generated at the expense of the stratospheric zonal mean available potential energy. This theoretical conclusion is obtained based on the quasi-geostrophic model in spherical coordinates which calculates the characteristic solutions for the basic zonal mean state changing with time. Author

N84-27083*# Instituto Geofisico del Peru, Lima.
EQUATORIAL MST RADARS: FURTHER CONSIDERATION c46

P. Lagos *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 36-39 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

The results presented give additional support to the need of equatorial MST radars in order to obtain more information on the nature of equatorial waves in the MST region. Radar deduced winds such as obtained at Jicamarca for periods of months indicate that with these data the full range of equatorial waves, with time scales of seconds to years, can be studied. Author

N84-27084*# Alaska Univ., Fairbanks. Geophysical Inst.
THE ECONOMICS OF DATA ACQUISITION COMPUTERS FOR ST AND MST RADARS c32

B. J. Watkins *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 40-48 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17B

Some low cost options for data acquisition computers for ST (stratosphere, troposphere) and MST (mesosphere, stratosphere, troposphere) are presented. The particular equipment discussed reflects choices made by the University of Alaska group but of course many other options exist. The low cost microprocessor and array processor approach presented here has several advantages because of its modularity. An inexpensive system may be configured for a minimum performance ST radar, whereas a multiprocessor and/or a multiarray processor system may be used for a higher performance MST radar. This modularity is important for a network of radars because the initial cost is minimized while future upgrades will still be possible at minimal expense. This modularity also aids in lowering the cost of software development because system expansions should rquire little software changes. The functions of the radar computer will be to obtain Doppler spectra in near real time with some minor analysis such as vector wind determination. Author

N84-27085*# Illinois Univ., Urbana. Dept. of Electrical Engineering.
INTERPRETATION OF MST RADAR RETURNS FROM CLEAR AIR c32

C. H. Liu *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 49-56 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The nature of the scattering and reflection mechanisms that give rise to the MST radar echoes from the clear air is essential in the correct interpretation of the data about winds, waves, turbulence and stability in the atmosphere. There are two main aspects: the nature of the targets the radar sees and their generation mechanisms; and the signatures of the radar signals returned from the different targets. Volume scatterings from isotropic or anisotropic turbulence, and partial reflections from horizontally stratified, sharp refractive index gradients are believed the main contributors to radar echoes. Combined effects from all the mechanisms probably produce the observed data. The signature of the echo signals for these different scatterers under realistic experimental conditions should be studied. It is hoped

from these studies, the nature of the targets can be better understood, and related to atmospheric dynamic processes. B.G.

N84-27086*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ON THE MORPHOLOGY OF THE SCATTERING MEDIUM AS SEEN BY MST/ST RADARS **c32**
K. S. Gage *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 57-67 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Much is learned about the morphology of the small scale structures of the atmosphere from analysis of echoes observed by MST radars. The use of physical models enables a synthesis of diverse observations. Each model contains an implicit assumption about the nature of the irregularity structure of the medium. A comparison is made between the irregularity structure implicit in several models and what is known about the structure of the medium. Author

N84-27087*# EISCAT Scientific Association, Kiruna (Sweden).
MORPHOLOGY OF THE SCATTERING TARGET: FRESNEL AND TURBULENT MECHANISMS **c32**
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 68-70 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Further studies of VHF radar signals from the troposphere and stratosphere revealed not only scattering from isotropic turbulence at scales of half the radar wavelength but also partial or Fresnel reflection or scattering from horizontally stratified temperature discontinuities. Proof for this observation was given by the large spatial and temporal coherence of radar signals. Thin structures, particularly in the stratosphere, may be persistent over some ten seconds, which is longer than the coherence time of 3 m scale turbulence in the stratosphere. The vertical thickness of the structures was estimated to be much thinner than 150 m. Observations over a longer time period indicate that these fine scale structures or sheets are clumped together forming patches or ensembles of mostly downward sloping structures. B.G.

N84-27088*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
RANGE GATE DEPENDENCE OF SPECULAR ECHOES **c32**
J. L. Green *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 73-77 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Some controversy has surrounded the interpretation of the enhancement of VHF radar echoes at vertical incidence (also known as partial reflections, specular reflections and Fresnel scattering) since they were reported by the Sunset and the SOUSY radars. There is little doubt as to the observational fact of this enhancement since it was observed by experimenters using at least eleven MST or ST radars. In addition to the Sunset and SOUSY radars, this result was obtained in the lower atmosphere at the Platteville, Poker Flat, Jicamarca Arecibo radars as well as the three radars of the ALPEX experiments. In the upper atmosphere, specular or partial reflections were observed. These vertical enhancements were associated with increases in the static stability of the atmosphere, with a temperature gradient in the stratosphere, were used to monitor the height of the tropopause, and were associated with the passage of fronts. B.G.

N84-27089*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
IS VHF FRESNEL REFLECTIVITY DUE TO LOW FREQUENCY BUOYANCY WAVES? **c32**
T. E. VanZandt and R. A. Vincent (Adelaide Univ., Australia) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 78-80 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

VHF radar echoes are greatly enhanced near the zenith relative to other directions. This enhancement must be due to reflection from horizontally stratified laminate of refractive index. The refractivity laminate are due to the displacements of low frequency buoyancy (internal gravity) waves acting on the background vertical gradient of refractivity. VANZANDT (1982) has shown that the observed spectra of mesoscale wind fluctuations in the troposphere and lower stratosphere are modeled by a universal spectrum of buoyancy (internal gravity) waves. Since the observed frequency spectrum is red, the buoyancy wave model of the vertical displacement spectrum is strongly enhanced near the zenith. In other terms, the resulting refractivity irregularities are strongly stratified. Author

N84-27090*# Illinois Univ., Urbana. Aeronomy Lab.
MESOSPHERIC SCATTER AND ITS MICROSTRUCTURE **c32**
S. A. Bowhill and K. P. Gibbs *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 81-82 ref (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

The difference in character between mesospheric returns from about 70 and about 80 km was noted. The 69-km echo is characterized by a single return with about .1 Hz width, while the 82.5 km return extends over more than 3 Hz bandwidth; this difference is also perceptible, but to a lesser degree, on the fading curves. The conclusion seems inescapable that internal random velocities of a few m/s are present within the scattering volume for the 82.5-km echo. The most likely source for these rather large velocities is convective instability arising from deformations of the temperature profile by breaking gravity waves. The distinction between the two types of scatter at these altitudes probably accounts for the behavior with frequency of the nightime fading period at low and very low frequencies. The fading period of D-region reflections at night was constant at about 7 min from 16 to 43 kHz, but that at frequencies of 70 kHz and above, the fading period decreased in such a way as to indicate the presence of irregularities smaller than about 1 km in size. This suggests that frequencies of 48 kHz and above, the fading period decreased in such a way as to indicate the presence of irregularities smaller than about 1 km in size. This suggests that frequencies of 48 kHz and below were reflected primarily from the region below 80 km where the narrow spectral irregularities dominate. B.G.

N84-27091*# National Severe Storms Lab., Norman, Okla.
FRESNEL ZONE CONSIDERATIONS FOR REFLECTION AND SCATTER FROM REFRACTIVE INDEX IRREGULARITIES **c32**
R. J. Doviak and D. S. Zrnic *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 83-97 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Several different echoing mechanisms are proposed to explain VHF/UHF scatter from clear air; (1) anisotropic scatter; (2) Fresnel reflection, and (3) Fresnel scatter, in order to account for the spatial (angle and range) and temporal dependence of the echoes. The term diffuse reflection describes the echoing mechanism when both scatter and reflection coexist. A unifying formulation is presented incorporating a statistical approach that embraces all mechanisms the above mechanisms and gives conditions under which reflection or scatter dominates. A distinction between Fraunhofer and Fresnel scatter and a criterion is presented under which Fresnel scatter is important. M.A.C.

N84-27092*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
EFFECTS OF PULSE WIDTH AND CODING ON RADAR RETURNS FROM CLEAR AIR **c32**
C. R. Cornish *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 98-99 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

In atmospheric radar studies it is desired to obtain maximum information about the atmosphere and to use efficiently the radar

transmitter and processing hardware. Large pulse widths are used to increase the signal to noise ratio since clear air returns are generally weak and maximum height coverage is desired. Yet since good height resolution is equally important, pulse compression techniques such as phase coding are employed to optimize the average power of the transmitter. Considerations in implementing a coding scheme and subsequent effects of an impinging pulse on the atmosphere are investigated. M.A.C.

N84-27093*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
THE EFFECTS OF PULSE RATE, POWER, WIDTH AND CODING ON SIGNAL DETECTABILITY c32
D. A. Carter *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 100-104 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The effects on the signal detectability of varying the pulse repetition rate (PRF), peak pulse power (p(pk)) and pulse width (tau(p)) (tp) are examined. Both coded and uncoded pulses are considered. The following quantities are assumed to be constant; (1) antenna area, (z)echo reflectivity, (3) Doppler shift, (4) spectral width, (5) spectral resolution, (6) effective sampling rate, and (7) total incoherent spectral averagaing time. The detectability is computed for two types of targets. M.A.C.

N84-27094*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
SPECTRAL CHARACTERISTICS OF THE MST RADAR RETURNS c32
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 105-111 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 17I

The salient features of the spectra of atmospheric returns due to random refractivity fluctuations in the Mesosphere, Stratosphere, Troposphere MST region are reviewed. The nonhomogeneous layered structure of turbulence is often evident as multiple peaks in the spectra. The time evolution of the spectra observed with a fine Doppler resolution provides evidence for thin regions of turbulence associated with gravity waves and shear instabilities. Embedded in these regions are horizontally extended refractivity structures that produce enhanced returns due to specular reflections. It is conceivable that some enhanced returns arise due to anisotropy of small scale refractivity structures. Observed correlations of the strength of the returns with their Doppler spread, wind shears, and winds provide insights into the physical mechanisms that produce turbulence. M.A.C.

N84-27095*# EISCAT Scientific Association, Kiruna (Sweden).
SPECTRAL CHARACTERISTICS OF THE RETURN c32
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 112-113 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Doppler spectra of VHF radar returns typically indicate a Gaussian back-ground shape with superimposed spikes. An average of 10 Doppler spectra are shown which are calculated from a time series of seven min of complex data. A proper Gaussian fit to the background distribution is possible by neglecting the strong amplitude spikes. If this background distribution is due to beam width broadening, either diffuse reflection or rather isotropic scattering is required. If beam width broadening is neglected, the width of the distribution is given by turbulent velocity fluctuations. The reflected component is about 1/3 of the scattered component. It is assumed that the amplitude spikes due to diffuse reflection indicate a Gaussian frequency distribution such as for the amplitudes due to scattering. M.A.C.

N84-27096*# EISCAT Scientific Association, Kiruna (Sweden).
INTERPRETATION OF RADAR RETURNS FROM CLEAR AIR: DISCRIMINATION AGAINST CLUTTER c32
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 114-119 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Different kinds of inteference may cause problems to the proper detection and analysis of the atmospheric signals, when using VHF and UHF radars. These are separated into passive and active contributions. Passive contributions are existent in the receiving system without the radar transmitter switched on. Active contributions are due to scatter and reflection of the own transmitted radar signal from unwanted targets, which are called clutter. Of major importance to radar systems are active interference contributions. Different methods can be applied for elimination or at least suppressing unwanted effects. These are; (1) Directional filtering, i.e., applying optimum suppression of antenna sidelobes, (2) Range filtering, i.e., suppressing unwanted signals only in affected range gates, (3) selection by amplitude distributions, (4) Temporal filtering, i.e., recognizing typical temporal variations of the clutter signals, through spectral characteristics, and applying matched filters. M.A.C.

N84-27097*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
DISCRIMINATION AGAINST INTERFERING SIGNALS AT THE POKER FLAT MST RADAR c32
D. A. Carter *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 120-121 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Several on line and off line data processing techniques are used to remove interfering signals due to ground clutter, aircraft, instrumental effects, and external transmissions from the desired atmospheric echoes of Mesosphere Stratosphere, Troposphere (MST) radar. The on line, real time techniques are necessarily simple in order to minimize processing delays. This algorithm examines the individual Doppler spectra which are computed every two to four seconds (for oblique antenna beams). The total spectral power in each individual spectrum is computed by summing all the spectral points. If this integrated power increases from one spectrum to the next by a factor greater than a preselected threshold, then that spectrum is not added to the spectral sum. Succeeding spectra are compared to the last acceptable spectrum. Only a certain maximum number of spectra are allowed to be rejected in succession. M.A.C.

N84-27098*# Illinois Univ., Urbana. Aeronomy Lab.
PULSE STUTTERING AS A REMEDY FOR ALIASED GROUND BACKSCATTER c32
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 122-123 (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

An algorithm that aides in the removal of ground scatter from low frequency Mesosphere, Stratosphere, Troposphere (MST) radar signals is examined. The unwanted ground scatter is shown as a sequence of velocity plots which are almost typical at the various altitudes. The interpulse period is changed in a cyclic way, thereby destroying the coherence of the unwanted signal. The interpulse period must be changed by an amount at least equal to the transmitted pulse width, and optimum performance is obtained when the number of different interpulse period occupies a time span greater than the coherence time of the unwanted signal. Since a 20-msec pulse width is used, it was found convenient to cycle through 50 pulses, the interpulse period changing from 2 msec to 3 msec during the 1/8-second time. This particular pattern of interpulse periods was provided by a software radar controller. With application of this algorithm, the unwanted scatter signal becomes incoherent from one pulse to the next, and therefore is perceived as noise by the coherent integrator and correlator. M.A.C.

N84-27099*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE DELTA S (DELTA R)-2 QUESTION: THE PULSE-LENGTH DEPENDENCE OF SIGNAL POWER FOR FRESNEL SCATTER **c32**

W. K. Hocking *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 124-135 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

It is proposed that the enhanced echoes from the atmosphere observed with a vertically pointing radar are due to reflections from horizontally stratified layers. The general case in which there are many closely spaced layers at random heights is called Fresnel scatter. The variation of received power with transmitter pulse length is examined for various models of Fresnel backscatter. It is shown that for the model most often used in previous work, the power is proportional to the pulse length, and not to the pulse length squared. However, for more general models a more complex pulse length dependence is found. M.A.C.

N84-27100*# Illinois Univ., Urbana. Dept. of Electrical Engineering.
JICAMARCA MESOSPHERIC OBSERVATIONS **c32**

O. Royrvik *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 136-142 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-19563)
Avail: NTIS HC A99/MF A01 CSCL 17I

In explaining the scattering of VHF radar signals from the mesosphere there are two observational facts that must be accounted for. These are; (1) the aspect sensitivity of the scattered signal and that this aspect sensitivity is largest in the lower part of the mesosphere, and (2) the correlating between the scattered power and the signal correlation time. This behavior is similar to that of the scattering from the troposphere/stratosphere region, and it is suggested that the scattering mechanisms are similar in these three regions. Several different experiments are performed. They all show strong indications of aspect sensitivity and changing correlation between scattered power and correlation time. There is no indication of stratified reflecting layers unless these layers are modulated in space and time to a degree that they cannot be distinguished from turbulence in any other way than that they cause somewhat aspect sensitive scattering. M.A.C.

N84-27101*# EISCAT Scientific Association, Kiruna (Sweden).
ORIGIN OF REFRACTIVE INDEX FLUCTUATIONS IN THE MESOSPHERE AS OPPOSED TO THE STRATOSPHERE AND TROPOSPHERE **c32**

J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 143-144 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Mesospheric echoes are strongly influenced by the electron density profile of the ionospheric D region. These echoes therefore are only observed during daylight hours or high energy particle precipitation. The turbulence occurs in layers, which often confines the radar echoes to rather thin regions of several 100 m vertical extent, although layers as thick as several kilometers are also observed. Evaluable echoes are not observed through the entire altitude region of the mesosphere for the given power aperture product. The echoes indicate temporal variation. M.A.C.

N84-27102*# National Oceanic and Atmospheric Administration, Boulder, Colo.
SOLAR CONTROL OF WINTER MESOSPHERIC ECHO OCCURRENCE AT POKER FLAT, ALASKA Abstract Only **c46**

W. L. Ecklund and B. B. Balsley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 145-146 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

Winter mesospheric echoes are observed between about 55 and 80 km when auroral absorption is present during daylight hours. Relatively steady auroral absorption during sunrise and sunset periods causes a distinct onset and decay signature in mesospheric echo occurrence. The echo onset and disappearance time are shown versus height by the inclined lines for four different dates. The more vertical lines give the visible sunlight height/time curves for both sunrise (SR) and sunset (SS). The data is combined and replotted to give the morning onset height and the afternoon disappearance height as a function of solar zenith angle. Echoes are not observed at the lowest heights in the morning until the solar zenith angle is less than 90 deg. The afternoon echoes at the lowest heights also start to disappear as soon as the solar zenith angle exceeds 90 deg, implying that the solar component which sustains the mesospheric echo is screened by a layer extending up to about 60 km. The morning echo at 73 km onsets near the time of visible sunrise, but in the afternoon the 73 km echo lasts well past visible sunset. M.A.C.

N84-27103*# Illinois Univ., Urbana. Aeronomy Lab.
NIGHTTIME MESOSPHERIC RETURNS ASSOCIATED WITH A LARGE SCALE FLARE EVENT **c32**

S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 147-149 refs (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

Magnetic storms associated with large flares can give D region ionization. Special measurements are made at night to evaluate the nature of mesospheric returns obtained under storm conditions. Five periods of time are tabulated varying in length from 20 min to 60 min at which scattered power is observed above the noise level. The three values of k(p) corresponding to the five periods are also given, as is the mean power over noise observed. The scattered powers from 78 to 81 km are comparable with those observed during the day, indicating that a similar ionization density is present. The peak power levels are approximately the same in both cases; but whereas the night data come from an essentially zero background, the day data arise from a substantial level of background scatter. This implies that the periods indicated are the only times at which any substantial particle precipitation is taking place; and that the consequent ionization is confined to the height region shown. M.A.C.

N84-27104*# EISCAT Scientific Association, Kiruna (Sweden).
TECHNIQUES FOR MEASUREMENTS OF HORIZONTAL AND VERTICAL VELOCITIES **c32**

J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 150-163 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Spectrum analysis and correlation methods used to measure the horizontal and vertical velocities of radar echo signals are examined mathematically. Topics include scattering/reflection geometry, monostatic versus bistatic operation, spaced antenna measurements, radar interferometry and the Doppler method. Vertical velocity determination, optimum pointing angles, and time resolution for periodic variations are also investigated. M.A.C.

N84-27105*# Stanford Univ., Calif. STAR Lab.
TECHNIQUES FOR MEASUREMENT OF VERTICAL AND HORIZONTAL VELOCITIES: MONOSTATIC VERSUS BISTATIC MEASUREMENTS **c32**

A. T. Waterman *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 164-169 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Three techniques of direct measurement are presented from which velocities may be obtained: (1) Doppler frequency shift, (2) spaced antenna drift, (3) spatially modulated transverse beam measurements. Emphasis is placed on the Doppler frequency measurement approach. It will compare bistatic with monostatic configurations as regards received power (or sensitivity), spatial resolution, Doppler shift and avoidance of ground clutter. M.A.C.

N84-27106*# Illinois Univ., Urbana. Aeronomy Lab.
A COMMENT ON SOME DRAWBACKS OF MONOSTATIC RADARS Abstract Only **c32**
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 170 (For primary document see N84-27076 17-17)
Avail: NTIS HC A99/MF A01 CSCL 17I

All Mesosphere, Stratosphere, Troposphere (MST) radars now in operation or under construction use the monostatic mode, that is to say, the same antenna for both transmitting and receiving. Consequently, it is never possible to determine more than one component of the atmospheric velocity at one point in space. Two important properties of gravity waves which are difficult if not impossible to determine by the monostatic method are discussed. The first of these is the polarization of the gravity waves; that is, the complex ratio of the wave functions of vertical and horizontal motion. A second quantity of importance is the horizontal wavelength of gravity waves. Both of these problems could be overcome by use of a bistatic system. Such a system has the additional advantage of making it possible to measure at very low altitudes, and to look away from the transmitter (for example to make a horizontal section through a thunderstorm). However, bistatic operation, in the practical sense, requires not only an additional highly directive antenna, but also that both the transmitting and receiving antennas should be fully steerable. M.A.C.

N84-27107*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE SPACED ANTENNA DRIFT METHOD **c32**
W. K. Hocking *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 171-186 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The spaced antenna drift method is a simple and relatively inexpensive method for determination of atmospheric wind velocities using radars. The technique has been extensively tested in the mesosphere at high and medium frequencies, and found to give reliable results. Recently, the method has also been applied to VHF observations of the troposphere and stratosphere, and results appear to be reliable. This paper discusses briefly the principle of the method, and investigates both its strengths and weaknesses. Some discussions concerning criticisms of the technique are also given, and it is concluded that while these criticisms may be of some concern at times, appropriate care can ensure that the method is at least as viable as any other method of remote wind measurement. At times, the technique has definite advantages. Author

N84-27108*# Illinois Univ., Urbana. Aeronomy Lab.
SPACED ANTENNA DRIFT **c32**
O. Royrvik *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 187-191 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-81-19563)
Avail: NTIS HC A99/MF A01 CSCL 17I

It has been suggested that the spaced antenna drift (SAD) technique could be successfully used by VHF radars and that it would be superior to a Doppler-beam-swinging (DBS) technique because it would take advantage of the aspect sensitivity of the scattered signal, and might also benefit from returns from single meteors. It appears, however, that the technique suffers from several limitations. On the basis of one SAD experiment performed at the very large Jicamarca radar, it is concluded that the SAD technique can be compared in accuracy to the DBS technique only if small antenna dimensions are used. B.W.

N84-27109*# National Severe Storms Lab., Norman, Okla.
AN EVALUATION OF THE ACCURACY OF SOME RADAR WIND PROFILING TECHNIQUES **c32**
A. J. Koscielny and R. J. Doviak *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 192-209 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Major advances in Doppler radar measurement in optically clear air have made it feasible to monitor radial velocities in the troposphere and lower stratosphere. For most applications the three dimensional wind vector is monitored rather than the radial velocity. Measurement of the wind vector with a single radar can be made assuming a spatially linear, time invariant wind field. The components and derivatives of the wind are estimated by the parameters of a linear regression of the radial velocities on functions of their spatial locations. The accuracy of the wind measurement thus depends on the locations of the radial velocities. The suitability is evaluated of some of the common retrieval techniques for simultaneous measurement of both the vertical and horizontal wind components. The techniques considered for study are fixed beam, azimuthal scanning (VAD) and elevation scanning (VED). B.W.

N84-27110*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ESTIMATING UNBIASED HORIZONTAL VELOCITY COMPONENTS FROM ST/MST RADAR MEASUREMENTS: A CASE STUDY **c47**
W. L. Clark, J. L. Green, and J. M. Warnock *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 210-214 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

In this paper a self-editing quick look procedure is presented for use at the Sunset radar. It is used for determining relatively unbiased hourly estimates of the u and v components of the wind. The technique presented here should be applicable to all height ranges, though only ST results are presented here. The vertical wind component, w, may be measured directly by pointing the radar beam straight up. The east and west components of the wind, u and v, however, must be estimated by projecting to the horizontal plane the radial velocity, vr, actually observed by pointing the radar suitably off zenith. B.W.

N84-27111*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ON THE MEASUREMENT OF VERTICAL VELOCITY BY MST RADAR **c47**
K. S. Gage *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 215-226 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

An overview is presented of the measurement of atmospheric vertical motion utilizing the MST radar technique. Vertical motion in the atmosphere is briefly discussed as a function of scale. Vertical velocity measurement by MST radars is then considered from within the context of the expected magnitudes to be observed. Examples are drawn from published vertical velocity observations. Author

N84-27112*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ACCURACY OF VERTICAL VELOCITY DETERMINATION **c47**
A. C. Riddle *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 227-231 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

Typical wind spectra taken at Poker Flat, Alaska, using the vertically oriented antenna show velocities of 10's of cm to meters per second and spectral widths winds of 0.5 to 1 m/s. The potential errors in such measurements can be broken down into three categories: (1) those due to instrumental parameters and data processing, (2) those due to specular returns from non-horizontal surfaces, and (3) those due to other physical effects. Error analysis in vertical velocity measurement is further discussed. B. W.

N84-27113*# Illinois Univ., Urbana. Aeronomy Lab.
EFFECTS OF GEOPHYSICAL NOISE ON THE ACCURACY OF WIND DETERMINATION Abstract Only **c47**
S. A. Bowhill *In* International Council of Scientific Unions Middle

Atmosphere Program, Vol. 9 Dec. 1983 p 235-236 (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 04B

The effects of geophysical noise on the accuracy of wind determination are discussed. The line-of-sight velocity is measured using an mst radar error analysis is also discussed. B.W.

N84-27114*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
RADAR INTERFEROMETER MEASUREMENTS **c32**
D. T. Farley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 237-240 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

A few attempts have been made to use MST radar interferometers in scatter probing of the ionosphere. A brief description of radar interferometer construction is given. These interferometer observations do not appear to have been successful. B.W.

N84-27115*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TECHNIQUES FOR STUDYING GRAVITY WAVES AND TURBULENCE **c46**
M. A. Geller *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 241-246 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 08E

Gravity waves and their associated breaking into turbulence are very important in producing the overall picture of middle atmosphere global dynamics and associated transport. It is shown in this research that MST radars represent a most powerful technique for obtaining the needed parameters for gravity-wave-induced drag and diffusion effects as well as measuring wave accelerations and diffusion directly. A mathematical solution to this problem is that of radiative equilibrium with a balanced thermal wind. B.W.

N84-27116*# National Oceanic and Atmospheric Administration, Boulder, Colo. Center for Research in the Environmental Sciences.
TECHNIQUES FOR STUDYING GRAVITY WAVES AND TURBULENCE: HORIZONTAL, VERTICAL AND TEMPORAL RESOLUTION NEEDED **c46**
S. K. Avery and D. A. Carter (NOAA, Boulder, Colo.) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 247-249 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

One of the most important atmospheric measurements that is needed is a measure of the gravity-wave spectrum. The MST radar has been investigated as means to measure the temporal resolution required to determine gravity-wave oscillations. The required vertical and horizontal resolution is dependent on the particular part of the gravity wave spectrum that is analyzed. Horizontal spacing is also discussed. B.W.

N84-27117*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
THE MST RADAR TECHNIQUE: A TOOL FOR INVESTIGATIONS OF TURBULENCE SPECTRA **c46**
M. F. Larsen *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 250-255 refs (For primary document see N84-27076 17-42)
(Grants NAGw-362; NSF ATM-81-08381)
Avail: NTIS HC A99/MF A01 CSCL 04A

The feasibility of the MST radar as a tool for investigating turbulence spectra is discussed. Power spectral measurements using radar data are discussed. The characteristics of stratospheric turbulence are described. A model of the mesoscale turbulent process is developed. B.W.

N84-27118*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
EXISTENCE OF A PERSISTENT BACKGROUND OF TURBULENCE **c46**
T. E. VanZandt *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

A plausible scenario for the existence of a persistent background of turbulence in the free atmosphere is described. The MST radar technique is the only existing technique that can be used to describe the morphology of occurrence of turbulence as a function of altitude, wind speed, shear, weather conditions, geographical location, etc. This technique was used also to assess the degree of universality of shape and amplitude of the buoyancy wave spectrum and the relation between the buoyancy wave spectrum and turbulence. B.W.

N84-27119*# EISCAT Scientific Association, Kiruna (Sweden).
DETERMINATION OF VERTICAL AND HORIZONTAL WAVELENGTHS OF GRAVITY WAVES **c46**
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 262-268 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

The determination of horizontal and vertical wavelengths of gravity waves obviously relies on measurement of wave parameters in horizontal and vertical directions. A very suitable parameter, measured fairly easily with MST radars, is the fluid velocity. Average velocities and superimposed turbulent fluctuations are much larger in the horizontal than in the vertical direction. Vertical and horizontal fluid velocities due to wave-like events are mostly about equal in magnitude. Vertical fluid velocities due to waves therefore can be more reliably detected than horizontal velocities. Estimates of gravity wave events using MST radar data are calculated and results are indicated. B.W.

N84-27120*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
TECHNIQUES FOR STUDYING GRAVITY WAVES AND TURBULENCE: VERTICAL WIND SPEED POWER SPECTRA FROM THE TROPOSPHERE AND STRATOSPHERE OBTAINED UNDER LIGHT WIND CONDITIONS Abstract Only **c46**
W. L. Ecklund, B. B. Balsley, M. Crochet (Lab. de Sondages Electromagnetiques de l'Environment Terrestre), D. A. Carter, A. C. Riddle, and R. Garello *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 269 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

A joint France/U.S. experiment was conducted near the mouth of the Rhone river in southern France as part of the ALPEX program. This experiment used 3 vertically directed 50 MHz radars separated by 4 to 6 km. The main purpose of this experiment was to study the spatial characteristics of gravity waves. The good height resolution (750 meters) and time resolution (1 minute) and the continuous operation over many weeks have yielded high resolution vertical wind speed power spectra under a variety of synoptic conditions. Vertical spectra obtained during very quiet (low wind) conditions in the troposphere and lower stratosphere from a single site are presented. B.W.

N84-27121*# Saskatchewan Univ., Saskatoon. Inst. of Space and Atmospheric Studies.
MEASUREMENT OF THE HORIZONTAL VELOCITY OF WIND PERTURBATIONS IN THE MIDDLE ATMOSPHERE BY SPACED MF RADAR SYSTEMS **c32**
C. E. Meek, A. H. Manson, and M. J. Smith *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 270-273 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

Two remote receiving sites have been set up at a distance of approx 40 km from the main MF radar system. This allows

measurement of upper atmosphere winds from 60-120 km (3 km resolution) at the corners of an approximately equilateral triangle of side approx 20 km. Some preliminary data are compared through cross correlation and cross spectral analysis in an attempt to determine the horizontal velocity of wind perturbations and/or the horizontal wavelength and phase velocity of gravity waves. Author

N84-27122*# Utah State Univ., Logan. Center for Atmospheric and Space Sciences.
EVIDENCE FOR PARALLEL ELONGATED STRUCTURES IN THE MESOSPHERE **c46**
G. W. Adams, J. W. Brosnahan (Tycho Technology, Inc., Boulder, Colo.), and D. C. Walden (NOAA, Boulder, Colo.) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 274-279 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-81-17275)
Avail: NTIS HC A99/MF A01 CSCL 04A

The physical cause of partial reflection from the mesosphere is of interest. Data are presented from an image-forming radar at Brighton, Colorado, that suggest that some of the radar scattering is caused by parallel elongated structures lying almost directly overhead. Possible physical sources for such structures include gravity waves and roll vortices. Author

N84-27123*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
PARAMETRIZATION OF FRESNEL RETURNS IN MIDDLE-ATMOSPHERE RADAR EXPERIMENTS **c32**
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 280-285 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 17I

Weak reflections from sharp discontinuities in radio refractivity are usually invoked to explain the results of radio propagation experiments. The characteristics of refractivity structures required to produce Fresnel returns are examined and experimental evidence for Fresnel returns in middle-atmosphere radar experiments is reviewed. The consequences of these returns on estimating the turbulence and wind parameters are outlined. Author

N84-27124*# EISCAT Scientific Association, Kiruna (Sweden).
PARAMETRIZATION OF FRESNEL RETURNS **c32**
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 286-288 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

It appears appropriate to use the intensity correlation function to investigate variations of a reflected signal component, and a scattered signal component, because it is determined by the relative motions, i.e., fluctuations of structual changes. An example of a correlation function is shown which can be separated into three parts: (1) a very fast drop between zero and the neighboring lag which is due to uncorrelated noise; (2) a smooth decrease at small large up to a few seconds which is due to scattering (this decrease can be approximated by a parabola); (3) a rather slow fadeout which is due to Frensel reflection and very gradually approaches zero correlation for longer lags. The noise contribution (part 1) must be eliminated by normalizing the correlation function by means of the zero-lag value which follows from a parabolic approximation. As signal intensity variations are directly connected to turbulent variations in a scattering medium or the changes of a reflecting discontinuity, parts (2) and (3) of the normalized correlation functions in terms of characteristic structure parameters, are evaluated. Author

N84-27125*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE RELATIONSHIP BETWEEN STRENGTH OF TURBULENCE AND BACKSCATTERING RADAR POWER AT HF AND VHF **c46**
W. K. Hocking *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 289-301 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

The formulae relating turbulence and other atmospheric parameters to backscattered power for radar observations are reviewed. Emphasis is on the case of scatter from turbulent irregularities which have scales corresponding to the range of isotropic, inertial range turbulence. The applicability of this assumption is discussed. A formula is introduced for the mesosphere which relates ionospheric electron densities to backscattered power. Author

N84-27126*# EISCAT Scientific Association, Kiruna (Sweden).
RELATIONSHIP OF STRENGTH OF TURBULENCE TO RECEIVED POWER **c46**
J. Rottger *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 302-303 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

Because of contributions due to reflection, the determination of the turbulence refractive index structure constant may be affected. For pure scattering from turbulence in the inertial subrange, the radar echo power can be used to calculate the refractive index structure constant. The radar power is determined by a convolution integral. If the antenna beam is swung to sufficiently large off-zenith angles (> 12.5 deg) so that a quasi-isotropic response from the tail ends of the Gaussian angular distribution can be anticipated, the evaluation of the convolution integral depends only on the known antenna pattern of the radar. This procedure, swinging the radar beam to attenuate the reflected component, may be called angular or direction filtering. The tilted antenna also may be pick up reflected components from near the zenith through the sidelobes. This can be tested by the evaluation of the correlation function. This method applies a time domain filtering of the intensity time series but needs a very careful selection of the high pass filters. A.R.H.

N84-27127*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ON THE EXTRACTION OF ATMOSPHERIC TURBULENCE PARAMETERS FROM RADAR BACKSCATTER DOPPLER SPECTRA. PART 1: THEORY Abstract Only **c46**
W. K. Hocking *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 304 Previously announced as 83A-29427 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

A theory is developed for the extraction of r.m.s. velocities of scatterer motions from spectra measured with a Doppler backscatter radar. The effects of finite beam-widths, finite pulse lengths, beam broadening, shear broadening, and the other such spectral contaminants are considered. It is shown that these contaminants can play a major role in determining the measured spectral widths (and, equivalently, the signal fading time), and so must be properly considered if the spectral widths are to be used to extract the r.m.s. motions of the scatterers. It is also shown that these r.m.s. motions can be used to estimate turbulence intensities, in those cases where turbulence is the dominant cause of the scatterer motions. Author (IAA)

N84-27128*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
MESOPHERIC TURBULENCE INTENSITIES MEASURED WITH A HF RADAR AT 35 DEG S. PART 2 Abstract Only **c46**
W. K. Hocking *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 304 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

A theory was developed for extracting turbulence energy dissipation rates from spectra measured with a radar. It is shown that factors apart from turbulence contribute to the observed spectral widths, and that these factors must be considered if accurate estimates of energy dissipation rates are to be obtained.

In particular, beam-width broadening and shear broadening are important. The first results obtained with this theory are presented. The rules were obtained using the large HF array at Adelaide, Australia, primarily during the Southern Hemisphere winter of 1981. Results are consistent with rocket measurements of turbulence, with typical values varying between 0.01 and 1/0.2 W kg at 80-90 km altitude. Author

N84-27129*# EISCAT Scientific Association, Kiruna (Sweden).
CAPABILITIES AND LIMITATIONS OF EISCAT AS AN MST RADAR c32
J. Rottger, M. Baron (SRI International), and K. Folkestad (Norwegian Defence Research Establishment) *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 305-314 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The European Incoherent Scatter Radar Facility also has facilities which can be used for coherent scatter research of the middle atmosphere. The observatory consists of two independent systems which allow observations of the upper, middle, and lower atmosphere: a tristatic UHF radar capable of vector drift measurements, and a monostatic VHF system. The characteristics of the components are are described including inter-site communication, on-line displays, and the real-time operating system. Analysis of about 60 hours of middle atmosphere observations in 1982 indicate that EISCAT's capabilities to measure mesospheric parameters should improve during moderately or strongly disturbed conditions, enabling measurement of profiles of wind velocity, electron density, and temperature/collision frequency, and in some instances, ion masses. Because of not yet optimized transmit-receive switching, some limitations exist in the monostatic mode when observing coherent scattering in the stratosphere at short ranges. A.R.H.

N84-27130*# Cornell Univ., Ithaca, N.Y.
CAPABILITIES AND LIMITATIONS OF THE JICAMARCA RADAR AS AN MST RADAR c32
R. F. Woodman (Inst. Geofisico del Peru) and D. T. Farley *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 315-319 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The Jicamarca radar (Long. 76.52W, Lat. 11.56S), located at 20 km from Lima at approximately 500 meters over sea level, is surrounded by mountains which provide a good shield from man-made interference. The radio horizon goes from a few hundred meters, across the dry valley where it is located, to 15 km, along the valley in the direction of the continental divide. This limits the clutter to 15 km, except for one high peak at 21 km. It is the most equatorial of all existing MST radars. Its proximity to the Andes, makes its location unique for the study of lee waves and orographic-induced turbulence. Vertical as well as horizontal projections of MST velocities are obtained by simultaneously pointing with different sections of the antenna into three or four different directions. The transmitters, receivers, and systems for data acquisition, processing, and control are included. A.R.H.

N84-27131*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
CHARACTERISTICS OF SUNSET RADAR c32
J. L. Green *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 320-324 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Located in a narrow canyon 15 km west of Boulder, Colorado, the Sunset pulsed Doppler radar was the first radar designed and constructed specifically as a VHF ST radar. The antenna system is a phased array of coaxial-colinear dopoles with computer-controlled phase shifters for each line of dipoles. It operates at a frequency of 40.475 MHz and a wavelength of 7.41M. Peak transmitter power is 100 kW. Aperture efficiency is 0.58 and resistive loss is 0.30 for its 3600 sq m area. The practical steering rate is 1 record/minute/position to any arbitrary antenna beam position. The first clear-air turbulence echoes and wind velocity measurements were obtained in 1974. Significant accomplishments are listed. A.R.H.

N84-27132*# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
CAPABILITIES AND LIMITATIONS OF EXISTING MST RADARS: COLORADO WIND PROFILERS c32
R. G. Strauch *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 325-329 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The Wave Propagation Laboratory is developing a ground-based remote sensing system called PROFILER to measure troposphere parameters currently measured in operational meteorology by radiosondes. The prototype PROFILER uses two radars for wind sounding: a 6-m radar located at Platteville, Colorado, and a 33-cm radar located at Denver's Stapleton International Airport. In addition, a network of three 6-m wind-profiling radars is being installed in Colorado, and a fourth site is planned. The location of the five radars, their characteristics, and their limitations are described. Author

N84-27133*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
CAPABILITIES AND LIMITATIONS OF EXISTING MST RADARS: POKER FLAT c32
B. B. Balsley, W. L. Ecklund, and D. A. Carter *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 330-337 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Designed as a prototype system to continuously monitor the atmosphere up to approximately 100 km, the Poker Flat MST radar began operating in 1979 at a relatively low sensitivity. In almost continuous operation since then, the system is steadily increasing in sensitivity to its ultimate design characteristics. Current and final parameters are listed. The advantages of its modular design, which uses 64 transmitting modules distributed through the 200 mx 200 m antenna array include: easy maintenance, beam switching using very low power switching, air cooled transmitting tubes, lower feedline costs, and no moving parts. Continuous, uninterrupted operation (> 4 years) and less man-made interference because of the remote location) are other assets. Most disadvantages are related to its not-yet-finished status, climate, moose excursions, and operating expenses. A.R.H.

N84-27134*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
COMPLEMENTARY CODE AND DIGITAL FILTERING FOR DETECTION OF WEAK VHF RADAR SIGNALS FROM THE MESOSCALE c32
G. Schmidt, R. Ruster, and P. Czechowsky *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 338-343 refs Repr. from IEEE Transactions on Geosci. Electron., vol. GE-17, no. 4, 1979 p 154-161 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The SOUSY-VHF-Radar operates at a frequency of 53.5 MHz in a valley in the Harz mountains, Germany, 90 km from Hanover. The radar controller, which is programmed by a 16-bit computer holds 1024 program steps in core and controls, via 8 channels, the whole radar system: in particular the master oscillator, the transmitter, the transmit-receive-switch, the receiver, the analog to digital converter, and the hardware adder. The high-sensitivity receiver has a dynamic range of 70 dB and a video bandwidth of 1 MHz. Phase coding schemes are applied, in particular for investigations at mesospheric heights, in order to carry out measurements with the maximum duty cycle and the maximum height resolution. The computer takes the data from the adder to store it in magnetic tape or disc. The radar controller is programmed by the computer using simple FORTRAN IV statements. After the program has been loaded and the computer has started the radar controller, it runs automatically, stopping at the program end. In case of errors or failures occurring during the radar operation, the

radar controller is shut off caused either by a safety circuit or by a power failure circuit or by a parity check system. A.R.H.

N84-27135*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
VHF RADAR MEASUREMENTS DURING MAP/WINE c32
P. Czechowsky, J. Klostermeyer, R. Ruster, G. Schmidt, and J. Rottger (EISCAT, Kiruna, Sweden) *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 344-345 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Sensitive Doppler radars which operate in the very high frequency (VHF) band, usually near 50 MHz can measure profiles of background winds, tides, atmospheric gravity waves and turbulence at tropospheric, stratospheric and mesospheric heights. Their ability to observe simultaneously large and small-scale processes makes them unique instruments for studying not only each process separately but also their nonlinear interactions. The mobile VHF radar to be used during the MAP/WINE campaign on Andoya is a modified version of the SOUSY VHF radar being in operation for six years in the Harz Mountains. A.R.H.

N84-27136*# Illinois Univ., Urbana. Aeronomy Lab.
THE URBANA MST RADAR, CAPABILITIES AND LIMITATIONS c32
O. Royrvik and L. D. Goss *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 346-356 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The 41-MHz coherent-scatter radar located northeast of the University of Illinois at Urbana is being used for studies of the troposphere, stratosphere and mesosphere regions. The antenna consists of 1008 halfwave dipoles with a physical aperture of 11000 sq m. Transmitted peak power is about 750 kW. Clear-air returns may be received from 6 km to 90 km altitude. Autocorrelation functions of the scattered signal are calculated on-line. From the autocorrelation functions the scattered power, line-of-sight velocity and signal correlation time are calculated. Some aspects of the troposphere/stratosphere and the mesosphere observations are discussed. Capabilities and limitations of the Urbana MST radar are pointed out, and recent and planned improvements to the radar are described. Author

N84-27137*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
STRATOSPHERE AND TROPOSPHERE (S-T) STUDIES AT MILLSTONE HILL. RECENT RESULTS, CAPABILITIES AND LIMITATIONS c46
P. K. Rastogi *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 357-368 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 04A

The 440-MHz incoherent-scatter radar at Millstone Hill has been used in recent years for studies of the troposphere and lower stratosphere with a fully steerable 150' antenna. The configuration of the radar system is briefly outlined. Clear-air returns are received over an altitude range 4 to 25 km. The power spectra of these returns can be measured with a range resolution of up to 300 m and a Doppler resolution of up to 4 cm/sec. Due to the lack of a natural shield around the radar, the ground clutter at Millstone is more severe than at other installations. With the use of a fine Doppler resolution, however, the atmospheric returns are readily discriminated from the clutter. Observations of turbulence structures, spatial inhomogeneity of turbulence, and enhanced turbulence associated with convective phenomena are described. Capabilities and limitations of the Millstone S-T radar are pointed out. M.G.

N84-27138*# Instituto Geofisico del Peru, Lima.
THE ARECIBO OBSERVATORY AS AN MST RADAR c32
R. F. Woodman *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 369-374 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The radars and other systems at the Arecibo Observatory were designed and built, originally, for incoherent-scatter and radio-astronomy research. More recently, important additions have been made for planetary radar and artificial RF heating of the ionosphere. Although designed and built for a different application, these systems have shown to be very powerful tools for tropospheric, stratospheric and mesospheric research. The Observatory at present has two main radars: one at 430 and the other at 2380 MHz. In addition, 50-MHz MST radar work has been done using portable transmitters brought to the Observatory for this purpose. This capability will become permanent with the recent acquisition of a transmitter at this frequency. Furthermore, control and data processing systems have been developed to use the powerful HF transmitter and antennas of the HF-heating facility as an HF bistatic radar. A brief description of the four radars available at the Observatory is presented. M.G.

N84-27139*# Alaska Univ., Fairbanks. Geophysical Inst.
CAPABILITIES AND LIMITATIONS OF THE SONDRESTROM RADAR FOR ST OBSERVATIONS c32
B. J. Watkins *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 375-380 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The Sondrestrom radar is located on the western side of Greenland near the U.S. air base and Danish community at Sondre Stromfjord. The radar was previously located at Chatanika, Alaska where its primary role was incoherent-scatter studies of the auroral ionosphere. Stratosphere/troposphere studies have occupied a very small portion of the radar observing schedule. The high operating frequency (1290 MHz) implies that the radar may only be used for turbulence-scatter studies in the troposphere and lower stratosphere. While the inner scale sizes of turbulence imply that the radar should be able to obtain data up to at least 20 km, in practice about 15 km seems to be the usual limit, due to lack of system sensitivity. However, this upper height limit varies from day to day and data have been obtained up to 23 km when a long (50 micro sec) pulse has been used. At high latitudes the tropopause is typically about 8 to 11 km altitude, therefore the radar is particularly suited to studies at tropopause heights. Additionally capabilities and limitations are discussed along with transmitter, receiver and antenna characteristics. M.G.

N84-27140*# Kyoto Univ. (Japan). Radio Atmospheric Science Center.
OUTLINE OF THE MU RADAR c32
S. Kato *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 381-382 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

A middle and upper atmospheric radar system is described. The antenna array consists of 25 groups each of which consists of 19 crossed-Yagis with three elements; each antenna has semiconductor transmitter and receiver, called a module, and each group of 19 antennas works as an independent small radar steering its radar beam under the control of a microcomputer. Thus, the total system consists of 25 small radars of this kind, enabling one to do various sophisticated operations with the system. The system is controlled by two other computers, one for radar controlling (HP9835A) and the other for data taking and on-line analysis (VAX11/750). The computer-controlled system is simple in operation for users and reliable in observation. Very quick beam steering (as quick as in a msec) is also possible because of electronic phase-changing of each module output under control of the microcomputer which is further controlled by the radar controller. M.G.

N84-27141*# National Central Univ., Chung-Li (Taiwan). Dept. of Atmospheric Physics.
CHUNG-LI, TAIWAN DUAL MODE (DOPPLER AND SPACED ANTENNA) VHF RADAR: PRELIMINARY SPECIFICATIONS

c32

J. Brosnahan (Tycho Technology, Inc., Boulder, Colo.), J. Chao, and J. Rottger (EISCAT, Kiruna, Sweden) *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 383-386 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

A major unresolved question in the field of atmospheric research using VHF radar techniques is the relative merit of the two most widely used systems. These systems are the Doppler method and the spaced antenna method. It has been suggested that one radar of each type be operated side by side for a direct comparison of the two techniques. This duplication of effort is not cost effective. The major components of both systems are identical, and one radar could be operated in both modes by proper design of a suitable antenna system and by proper data analysis. The Chung-Li radar will be able to switch between modes on a time scale of seconds and is the first VHF radar to be able to directly compare the Doppler data with spaced antenna data. The system will have performance comparable with the present SOUSY spaced antenna system and will provide mesospheric data in addition to stratospheric and tropospheric data. The major specifications of the Chung-Li radar are given. M.G.

N84-27142*# Rutherford High Energy Lab., Chilton (England). Rutherford Appleton Lab.
DESIGN CONSIDERATIONS OF A PROPOSED UK VHF RADAR c32

A. J. Hall *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 387-397 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The major features of a proposed UK VHF radar for meso-, strato-, and tropospheric studies are discussed. The research interests of potential users which were considered in the design analysis are listed. M.G.

N84-27143*# Tycho Technology, Inc., Boulder, Colo.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS (KEYNOTE PAPER) c32

J. W. Brosnahan *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 403-405 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

A review and analysis of conference papers addressing the design of high power VHF radar tranceivers is presented. Specific design topics include: (1) distributed versus single transmitters; (2) coded pulses and decoder design; (3) large transmitter design considerations; and (4) T/R switch design. The topics in the discussion on future directions include the following: (1) enhanced receiver performance; (2) transmitter systems for unattended operation; (3) limitations of the current T/R switch designs; (4) data processing (is eight bits enough); and (5) new frequencies (200 MHz and/or 400 MHz). M.G.

N84-27144*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS: DISTRIBUTED VERSUS SINGLE LARGE TRANSMITTER c32

W. L. Ecklund and B. B. Balsley *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 406-407 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The factors which enter into the choice of using a single large transmitter versus a number of smaller units in clear-air radar systems are examined. Feedline economics, ease of repair and spare part costs, operating strategy, vulnerability to catastrophic failure, and phase control requirements are considered. M.G.

N84-27145*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
PULSE COMPRESSION USING BINARY PHASE CODES c32

D. T. Farley *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 410-414 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

In most MST applications pulsed radars are peak power limited and have excess average power capacity. Short pulses are required for good range resolution, but the problem of range ambiguity (signals received simultaneously from more than one altitude) sets a minimum limit on the interpulse period (IPP). Pulse compression is a technique which allows more of the transmitter average power capacity to be used without sacrificing range resolution. As the name implies, a pulse of power P and duration T is in a certain sense converted into one of power nP and duration T/n. In the frequency domain, compression involves manipulating the phases of the different frequency components of the pulse. One way to compress a pulse is via phase coding, especially binary phase coding, a technique which is particularly amenable to digital processing techniques. This method, which is used extensively in radar probing of the atmosphere and ionosphere is discussed. Barker codes, complementary and quasi-complementary code sets, and cyclic codes are addressed. M.G.

N84-27146*# Instituto Geofisico del Peru, Lima.
DECODERS FOR MST RADARS c32

R. F. Woodman *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 416-420 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Decoding techniques and equipment used by MST radars are described and some recommendations for new systems are presented. Decoding can be done either by software in special-purpose (array processors, etc.) or general-purpose computers or in specially designed digital decoders. Both software and hardware decoders are discussed and the special case of decoding for bistatic radars is examined. M.G.

N84-27147*# Kyoto Univ. (Japan). Radio Atmospheric Science Center.
A TRANSCEIVER MODULE OF THE MU RADAR c32

S. Kato, T. Ogawa, T. Tsuda, T. Sato, I. Kimura, and S. Fukao *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 421-423 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The transceiver (TR) module of a middle and upper atmospheric radar is described. The TR module used in the radar is mainly composed of two units: a mixer (MIX unit) and a power amplifier (PA unit). The former generates the RF wave for transmission and converts the received echo to the IF signal. A 41.5-MHz local signal fed to mixers passes through a digitally controlled 8-bit phase shifter which can change its value up to 1,000 times in a second, so that the MU radar has the ability to steer its antenna direction quickly and flexibly. The MIX unit also contains a buffer amplifier and a gate for the transmitting signal and preamplifier for the received one whose noise figure is less than 5 dB. The PA unit amplifies the RF signal supplied from the MIX unit up to 63.7 dBm (2350 W), and feeds it to the crossed Yagi antenna. M.G.

N84-27148*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS: THE POKER FLAT MST RADAR PHASE CONTROL SYSTEM c32

W. L. Ecklund and P. E. Johnson *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 424-426 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Sixty-four separate 50-kW peak-power transmitters are distributed throughout the 200 x 200 meter Poker Flat MST radar antenna array. The relative phase of each transmitter is automatically controlled by a 64-channel unit located in the main building at the edge of the antenna. The phase control unit is described. In operation the RF pulse from a transmitter coupler is power

divided and compared with the phase reference in a mixer. The mixer output is low-pass filtered and sampled near the center of the resulting video pulse by an amplifying sample-and-hold integrated circuit. Phase control is effected by maintaining the mixer output pulse near zero volts by amplifying the sample-and-hold output which then drives the voltage-controlled phase shifter in the direction to null the mixer output. The voltage-controlled shifter achieves over 360 deg phase shift in the range from 0.7 to 24 volts. When the voltage into the shifter tracks to either voltage limit the wrap-around control resets the voltage so that the shifter is always operating within its control range. M.G.

N84-27149*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS: PHASE MATCHING LONG COAXIAL CABLES USING A CABLE RADAR c32
P. E. Johnson and W. L. Ecklund *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 427-428 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The Poker Flat 49.92-MHz MST radar uses 64 phase-controlled transmitters in individual shelters distributed throughout the antenna array. Phase control is accomplished by sampling the transmitted pulse at the directional coupler of each transmitter and sending the sample pulse back to a phase-control unit. This method requires phase matching 64 long (256 meter) coaxial cables (RG-213) to within several electrical degrees. Tests with a time domain reflectometer showed that attenuation of high frequency components in the long RG-213 cable rounded the leading edge of the reflected pulse so that the cables could only be measured to within 50 cm (about 45 deg at 49.92 MHz). Another measurement technique using a vector voltmeter to compare forward and reflected phase required a directional coupler with unattainable directivity. Several other techniques were also found lacking, primarily because of loss in the long RG-213 cables. At this point it was realized that what was needed was a simple version of the phase-coherent clear-air radar, i.e., a cable radar. The design and operation of this cable are described. M.G.

N84-27150*# Tycho Technology, Inc., Boulder, Colo.
MST RADAR TRANSMITTER CONTROL AND MONITOR SYSTEM Abstract Only c32
J. W. Brosnahan *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 429-430 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

A generalized transmitter control and monitor card was developed using the Intel 8031 (8051 family) microprocessor. The design was generalized so that this card can be utilized for virtually any control application with only firmware changes. The block diagram appears in Figure 2. The card provides for local control using a 16 key keypad (up to 64 keys are supported). The local display is four digits of 7 segment LEDs. The display can indicate the status of all major system parameters and provide voltage readout for the analog signal inputs. The card can be populated with only the chips required for a given application. Fully populated, the card has two RS-232 serial ports for computer communications. It has a total of 48 TTL parallel lines that can define as either inputs or outputs in groups of four. A total of 32 analog inputs with a 0-5 volt range are supported. In addition, a real-time clock/calendar is available if required. A total of 16 k bytes of ROM and 16 k bytes of RAM is available for programming. This card can be the basis of virtually any monitor or control system with appropriate software. M.G.

N84-27151*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
DESIGN CONSIDERATIONS FOR HIGH-POWER VHF RADAR TRANSCEIVERS: T/R SWITCH DESIGN Abstract Only c32
W. L. Ecklund *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 431-432 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The transceiver (TR) switch developed at NOAA's Aeronomy Laboratory for use in their 50 kW peak power, 50 MHz transmitter is described. The switch mounts inside the transmitter chassis and was designed to be compact while retaining the ability to handle well over 50 kW peak power at average power levels up to 2 kW. The TR switch is a conventional TR/ATR design with equivalent /4 transmission line sections constructed of lumped constant coils and transmitting capacitors in "Tee' sections. Two TR sections are placed in series to achieve adequate receiver protection. The switch is set into the "transmit' mode by forward biasing the 3 pin diodes to about 1.2 amperes each. The receive mode is achieved by back biasing the diodes to -15 volts. A directional coupler is also incorporated into the TR switch box to provide a convenient monitor point for forward and reflected transmitter power. M.G.

N84-27152*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE MOBILE SOUSY-DOPPLER RADAR: TECHNICAL DESIGN AND FIRST RESULTS c32
P. Czechowsky, G. Schmidt, and R. Ruster *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 433-446 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

A mobile VHF Doppler system was developed. The electronic part is installed in a 20 ft container and tested using a special log periodic aerial to illuminate the 300 m dish. The system was extended by designing a mobile phased antenna array with finally 576 Yagi elements. The grouping of the single Yagis, the system of transmission lines, the phase shifters, the power splitters and the T/R switch are described. Results from the first two campaigns and a survey of future programs demonstrating the flexibility of this mobile system are summarized. E.A.K.

N84-27153*# Illinois Univ., Urbana. Aeronomy Lab.
DESIGN CONSIDERATIONS FOR MST RADAR ANTENNAS c32
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 447-455 refs (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

The design of antenna systems for radar capable of probing the mesosphere are discussed. The spatial wavelength dependency of turbulent advected ionization are cut off rapidly below wavelengths of about 3 m, imply frequencies of 100 MHz and below. The frequency and aperture requirements point to an array antenna of some kind as the most economical solution. Such an array could consist of dipoles or more directive elements; these elements can be either active or passive. E.A.K.

N84-27154*# Bharat Electronics Ltd., Ghaziabad (India).
DIRECTIVITY AND SPACING FOR THE ANTENNA ELEMENTS c32
V. K. Koshy *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 456-462 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The optimum design choice for the MST radar antenna was considered. The following factors are required: directivity and gain; beam width and its symmetry; sidelobe levels, near and wide angle; impedance matching; feeder network losses; polarization diversity; steerability; cost effectiveness; and maintainability. The directivity and related beam forming aspects of various antenna elements and directivity aspects when such elements are formed into an array are discussed. Array performance for important variables, in particular, the spacing of the elements is considered. E.A.K.

N84-27155*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
FULL VERSUS LIMITED VERSUS NO STEERABILITY c32

B. B. Balsley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 463-464 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The range of phenomena of the MST radar technique to divide the steerability versus nonsteerability problem into two broad with a third subset that lies between these two limits are studied. Processes that vary on a horizontal scale which are comparable to the area of the probing radar beam can best be fully steerable beams. The use of fixed beam systems would be a long term study of the mean wind field. Orographic effects due to mountain ridges and/or land-sea interfaces demand steerable beams, particularly if the effects are three dimensional in character. In view of their lack of moving parts fixed beam systems are more reliable. It is assumed that the reliability of a system is inversely proportioned to the number of moving parts. This is not a problem for fixed beam systems. E.A.K.

N84-27156*# Cornell Univ., Ithaca, N.Y.
SCHOOL OF ELECTRICAL ENGINEERING. c32
D. T. Farley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 465-466 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The possibility of making the antenna of an MST radar too large is pointed out. It is not that the signal ceases to become stronger beyond some critical antenna size; the received scattered signal actually becomes weaker as the antenna size is increased whenever the target is in the near field, Fresnel region of the antenna. The Arecibo antenna is a case in point. It is supposed that MST work would benefit to use a feed which illuminated only a portion of the dish. E.A.K.

N84-27157*# Tycho Technology, Inc., Boulder, Colo.
DELAY LINE AND MUTUAL COUPLING CONSIDERATIONS FOR MST RADAR ANTENNA ARRAYS c32
J. W. Brosnahan *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 467-469 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Basic antenna theory which states that the field radiated from an antenna array is equal to the sum of the currents flowing in each element of the array is discussed. The feedline distribution system guarantees the proper amplitude and phase of the current for each element of an array. The difference in electrical lengths of the feedlines to the elements has to equal the desired phase angle. The current for voltage delay in a transmission line is equal to the transmission line electrical length in only a few special cases, when the transmission line is terminated in its characteristic impedance or when the transmission line's electrical length is a multiple of 90 degrees. E.A.K.

N84-27158*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
REVIEW OF SPECIFIC ANTENNA CONFIGURATIONS: AN ESTIMATE OF COST AND PERFORMANCE VERSUS FREQUENCY FOR A SIMPLE (10 LAMBDA)-2 CLEAR-AIR RADAR ANTENNA ARRAY c32
W. L. Ecklund *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 470-476 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The building of operational clear air radar wind profilers is discussed. The choice of operating frequency and antenna configuration for these profilers is examined. The cost and performance of a (10 lambda) 2 antenna array versus operating frequency over the range 30 to 400 MHz is compared. To simplify the comparison the array beam will be fixed and the array will be uniformly fed. Yagi and coaxial collinear (COCO) cable antennas are compared, although other configurations may be competitive. It is assumed that the array is driven by a typical 50 kW peak power, 1 kW average, power transmitter located at the array edge when calculating feedline power handling requirements and when system performance is compared. For this comparison an array aperture of (10 lambda) 2 was chosen since a one way beam width of 5 deg or less is desirable to limit beam spreading effects. E.A.K.

N84-27159*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
DATA PROCESSING TECHNIQUES USED WITH MST RADARS: A REVIEW c32
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 477-488 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 17I

The data processing methods used in high power radar probing of the middle atmosphere are examined. The radar acts as a spatial filter on the small scale refractivity fluctuations in the medium. The characteristics of the received signals are related to the statistical properties of these fluctuations. A functional outline of the components of a radar system is given. Most computation intensive tasks are carried out by the processor. The processor computes a statistical function of the received signals, simultaneously for a large number of ranges. The slow fading of atmospheric signals is used to reduce the data input rate to the processor by coherent integration. The inherent range resolution of the radar experiments can be improved significant with the use of pseudonoise phase codes to modulate the transmitted pulses and a corresponding decoding operation on the received signals. Commutability of the decoding and coherent integration operations is used to obtain a significant reduction in computations. The limitations of the processors are outlined. At the next level of data reduction, the measured function is parameterized by a few spectral moments that can be related to physical processes in the medium. The problems encountered in estimating the spectral moments in the presence of strong ground clutter, external interference, and noise are discussed. The graphical and statistical analysis of the inferred parameters are outlined. The requirements for special purpose processors for MST radars are discussed. E.A.K.

N84-27160*# Arecibo Ionospheric Observatory, Puerto Rico.
DECODING: CODES AND HARDWARE IMPLEMENTATION c61
M. P. Sulzer and R. F. Woodman (Inst. Geofisico del Peru, Lima) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 489-495 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 09B

The MST radars vary considerably from one installation to the next in the type of hardware, operating schedule and associated personnel. Most such systems do not have the computing power to decode in software when the decoding must be performed for each received pulse, as is required for certain sets of phase codes. These sets provide the best signal to sidelobe ratio when operating at the minimum band length allowed by the bandwidth of the transmitter. The development of the hardware phase decoder, and the applicability of each to decoding MST radar signals are discussed. A new design for a decoder which is very inexpensive to build, easy to add to an existing system and is capable of decoding on each received pulse using codes with a band length as short as one microsecond is presented. E.A.K.

N84-27161*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
DECODING: SOFTWARE IMPLEMENTATIONS c61
G. B. Loriot *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 496-506 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 09B

The motivation to use phase coded observations for the stratosphere-troposphere region is discussed. Previous work using hardware correlators to decode the received signal is referred. An

alternative technique using software to decode the signal samples is described, and results of the implementation are presented. E.A.K.

N84-27162*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
COHERENT INTEGRATION c33
D. T. Farley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 507-508 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 09C

Coherent integration which is a digital filtering process and was applied to MST radar observations is discussed. It is simple to implement with either hardware or software and is appropriate for the very narrow band signals usually received by MST radars. By filtering the signal before performing spectral processing, the computations required for FFT or similar analysis are greatly reduced. Coherent integration does not increase the signal-to-noise ratio per unit bandwidth in the signal band. It filters out much of the wideband noise, which could also be done by full FFT processing of the raw signal. E.A.K.

N84-27163*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
A NOTE ON THE USE OF COHERENT INTEGRATION IN PERIODOGRAM ANALYSIS OF MST RADAR SIGNALS c32
P. K. Rastogi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 509-512 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 20N

The effect of coherent integration on the periodogram method to estimate the power spectra of MST radar signals is examined. The spectrum estimate usually is biased, even when care is taken to reduce the aliasing effects. Due to this bias, the signal power for Doppler shifted signals is underestimated by as much as 4 dB. The use of coherent integration in reducing the effect of aliased power line harmonics is pointed out. E.A.K.

N84-27164*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
SIGNAL PROCESSOR ARCHITECTURE FOR BACKSCATTER RADARS c32
W. E. Swartz and P. Johnston (NOAA, College, Ark.) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 513-519 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 20N

Real time signal processing for backscatter radars which requires computational throughput and I/O rates is discussed. The operations that are usually performed in real time are highly repetitive simple accumulations of samples or of products of samples. The control logic does not depend on the values of the data and general purpose computers are not required for the initial high speed processing. The implications of these facts on the architectures of preprocessors for backscatter radars are explored and applied to the design of the Radar Signal Compender. E.A.K.

N84-27165*# Illinois Univ., Urbana. Aeronomy Lab.
REAL-TIME MST RADAR SIGNAL PROCESSING USING A MICROCOMPUTER RUNNING UNDER FORTH c32
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 520 (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

Data on power, correlation time, and velocity were obtained at the Urbana radar using microcomputer and a single floppy disk drive. This system includes the following features: (1) measurement of the real and imaginary components of the received signal at 20 altitudes spaced by 1.5 km; (2) coherent integration of these components over a 1/8-s time period; (3) continuous real time display of the height profiles of the two coherently integrated components; (4) real time calculation of the 1 minute averages of the power and autocovariance function up to 6 lags; (5) output of these data to floppy disk once every 2 minutes; (6) display of the 1 minute power profiles while the data are stored to the disk; (7) visual prompting for the operator to change disks when required at the end of each hour of data; and (8) continuous audible indication of the status of the interrupt service routine. Accomplishments were enabled by two developments: the use of a new correlation algorithm and the use of the FORTH language to manage the various low level and high level procedures involved. E.A.K.

N84-27166*# Illinois Univ., Urbana. Aeronomy Lab.
REVIEW OF CORRELATION TECHNIQUES c32
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 521-526 refs (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 17I

Correlation analysis in MST radar to determine the scattered power, Doppler frequency and correlation time for a noisy signal is examined. It is assumed that coherent detection was employed, with two accurately balanced quadrature receiving channels and that coherent integration is performed with a window length significantly less than the correlation time of the signal. E.A.K.

N84-27167*# EISCAT Scientific Association, Kiruna (Sweden).
CORRELATION METHODS Abstract Only c32
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 527 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

A method for processing complex radar data with a computer using correlation functions is reviewed. Parameters including data storage, data reduction, and real time operation are addressed. Since complex auto- and cross-correlation functions are calculated and stored, almost no information is lost. These also can be analyzed in terms of the full correlation analysis of the spaced-antenna-drifts technique. The proposed approach therefore appears to be very feasible to suit most Mesosphere-Stratosphere-Troposphere (MST) radar applications. R.S.F.

N84-27168*# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
DATA ANALYSIS TECHNIQUES: SPECTRAL PROCESSING c32
R. G. Strauch *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 528-531 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

The individual steps in the data processing scheme applied to most radars used for wind sounding are analyzed. This processing method uses spectral analysis and assumes a pulse Doppler radar. Improvement in the signal to noise ratio of some radars is discussed. R.S.F.

N84-27169*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
SIGNAL PROCESSING AT THE POKER FLAT MST RADAR c32
D. A. Carter *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 532-534 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Signal processing for Mesosphere-Stratosphere-Troposphere (MST) radar is carried out by a combination of hardware in high-speed, special-purpose devices and software in a general-purpose, minicomputer/array processor. A block diagram of the signal processing system is presented, and the steps in the processing pathway are described. The current processing capabilities are given, and a system offering greater coherent integration speed is advanced which hinges upon a high speed preprocessor. R.S.F.

N84-27170*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
PARMETERIZATION OF SPECTRA c32
C. R. Cornish *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 535-542 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Following reception and analog to digital conversion (A/D) conversion, atmospheric radar backscatter echoes need to be processed so as to obtain desired information about atmospheric processes and to eliminate or minimize contaminating contributions from other sources. Various signal processing techniques have been implemented at mesosphere-stratosphere-troposphere (MST) radar facilities to estimate parameters of interest from received spectra. Such estimation techniques need to be both accurate and sufficiently efficient to be within the capabilities of the particular data-processing system. The various techniques used to parameterize the spectra of received signals are reviewed herein. Noise estimation, electromagnetic interference, data smoothing, correlation, and the Doppler effect are among the specific points addressed. R.S.F.

N84-27171*# Kyushu Inst. of Tech., Kitakyushu (Japan).
PROPERTIES OF ECHO SPECTRA OBSERVED BY MST RADARS c32
K. Wakasugi *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Turbulent scatter and Fresnel reflection are the fundamental echoing mechanisms to interpret the signals observed by Mesosphere-stratosphere-troposphere (MST) radars. Turbulent scattered echoes provide information about the turbulence structure and mean flow of the atmosphere. Observational results with VHF MST radars, however, show the importance of Fresnel reflection due to the infinite gradient of reflectivity at the edges of a scattering layer. This condition is excluded for the weak fluctuation models but it is still possible to include the observed aspect sensitivity by assuming an anisotropic structure of fluctuations. Another explanation of the aspect sensitivity observed by MST radars is advanced. Spectral estimates by the widely used periodogram were related to a four-dimensional spectrum of atmospheric fluctuations with anisotropic structure. Effects of the radar system such as antenna beam width, beam direction and Fast Fourier Transformations (FFT) data length were discussed for the anisotropic turbulent atmosphere. Echo parameters were also estimated. R.S.F.

N84-27172*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
PARAMETERIZATION OF SPECTRUM c32
A. C. Riddle *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 546-547 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Many radars used for wind sounding generate Doppler power spectra as output. For compact data archiving purposes, as well as for data analysis, several parameters were produced to characterize each spectrum. The parameters chosen were noise level, echo signal strength, velocity, and width. Because the derived parameters may be the only quantities available for future analysis, it was important that they did not contain biases imposed by the derivation techniques. This consideration led to a processing scheme in which the parameters were derived independently for each spectrum. R.S.F.

N84-27173*# Instituto Geofisico del Peru, Lima.
SPECTRAL MOMENT ESTIMATION IN MST RADARS c32
R. F. Woodman *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 548-562 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 17I

Signal processing techniques used in Mesosphere-Stratosphere-Troposphere (MST) radars are reviewed. Techniques which produce good estimates of the total power, frequency shift, and spectral width of the radar power spectra are considered. Non-linear curve fitting, autocovariance, autocorrelation, covariance, and maximum likelihood estimators are discussed. R.S.F.

N84-27174*# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Electrical Engineering and Applied Physics.
THE DISCRETE PROLATE SPHEROIDAL FILTER AS A DIGITAL SIGNAL PROCESSING TOOL c32
J. D. Mathews, J. K. Breakall (California Univ., Lawrence Livermore Lab.), and G. K. Karawas *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 563-572 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-79-18379)
Avail: NTIS HC A99/MF A01 CSCL 17I

The discrete prolate spheriodall (DPS) filter is one of the glass of nonrecursive finite impulse response (FIR) filters. The DPS filter is superior to other filters in this class in that it has maximum energy concentration in the frequency passband and minimum ringing in the time domain. A mathematical development of the DPS filter properties is given, along with information required to construct the filter. The properties of this filter were compared with those of the more commonly used filters of the same class. Use of the DPS filter allows for particularly meaningful statements of data time/frequency resolution cell values. The filter forms an especially useful tool for digital signal processing. R.S.F.

N84-27175*# SRI International Corp., Menlo Park, Calif.
MST RADAR DATA-BASE MANAGEMENT c82
V. B. Wickwar *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 573-576 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 05B

Data management for Mesospheric-Stratospheric-Tropospheric, (MST) radars is addressed. An incoherent-scatter radar data base is discussed in terms of purpose, centralization, scope, and nature of the data base management system. R.S.F.

N84-27176# Hunter Geophysics, Mountain View, Calif.
DETERMINATION OF PROPPED FRACTURE LENGTH BY DETECTION OF INJECTED MAGNETIC MATERIAL WITH SURFACE SUPERCONDUCTING MAGNETOMETERS Final Report, Feb. 1982 - Jul. 1983
M. D. Wood and C. W. Parkin Mar. 1984 124 p refs
(Contract GRI-5081-211-0558)
(PB84-181320; GRI-84/0041) Avail: NTIS HC A06/MF A01 CSCL 08J

Superconducting SQUID (Superconducting Quantum Interference Device) magnetometer and data acquisition hardware and software were developed and tested, and a surface array of seven SQUIDS was deployed to map a magnetically tagged proppant in two field tests. Accomplishments leading to the tests included: (1) development of theoretical solutions of the magnetic fields for variety of magnetically tagged proppant geometries and dimensions; (2) scale modeling using proppant tag materials; (3) extension of tiltmeter real time analysis to support the magnetometer field tests; and (4) two sets of field shakedown experiments to pretest the magnetometers and data acquisition hardware and software. For the second set of tests, conducted after all modifications of the magnetometers had been completed, the SQUID data were analyzed to successfully map a shallow, magnetically tagged proppant in a horizontal fracture. The radius was determined to be 60 feet at shut in, with disk center offset to the east-northeast of the well bore. Author (GRA)

N84-27177# Joint Publications Research Service, Arlington, Va.
USSR REPORT: EARTH SCIENCES
18 May 1984 87 p Transl. into ENGLISH from various Russian articles
(JPRS-UES-84-004) Avail: NTIS HC A05/MF A01

Abstracts of articles addressing various topics in meteorology and climatology, oceanography, geophysics, and atmospheric physics are presented. Some emphasis is given to ocean-

atmosphere interactions, seismology, ocean currents, gravimetry, and magnetometry, and volcanology. For individual titles, see N84-27178 through N84-27244.

N84-27178# Joint Publications Research Service, Arlington, Va.
CLIMATE MODELING AT PACIFIC OCEAN INSTITUTE OF GEOGRAPHY c47
S. Glukhov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 1-4 Transl. into ENGLISH from Vozdushnyy Transport (Moscow), 15 Feb. 1984 p 4 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The development of mathematical models of climate at the Pacific Ocean Institute of Geography of the Far East Research Center is briefly discussed. The importance of accurately modeling sea and land ice conditions is emphasized. M.G.

N84-27179# Joint Publications Research Service, Arlington, Va.
EVALUATION OF PROBABILITIES OF LARGE DEVIATIONS OF CLIMATIC CHARACTERISTICS FROM PRESENT LEVELS Abstract Only c47
P. F. Demchenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 5 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1259-1266 Original language document was announced as A84-21045 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Reference is made to studies by Sutera (1981) and Benzi et al. (1981), which used a stochastic 'zero-dimensional' model for the evolution of the mean hemispherical temperature to evaluate the average time necessary for a spontaneous transition to complete glaciation of the Earth. Consideration is given here to a model with two degrees of freedom for the evolution of the mean hemispherical temperature and the latitude forming the boundary between ice and snow. With the aid of the asymptotic theory of quasi-potential elaborated by Venttsel' and Freidlin (1970, 1979), the mean times necessary for these variables to attain a certain fixed level are determined. It is found that with the present values of the parameters of the Earth's climate, the average times necessary for a spontaneous transition to complete galaciation and spontaneous melting of the snow-ice cover exceed the Earth's geological age. C.R. (IAA)

N84-27180# Joint Publications Research Service, Arlington, Va.
PRESENT-DAY STATUS OF INVESTIGATIONS OF ANTHROPOGENIC INFLUENCE ON ATMOSPHERIC OZONE Abstract Only c46
K. Ya. Kondratyev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 6 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1235-1251 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The present day status of research on global spatial-temporal variability of the total content of atmospheric ozone is described. There is still a probable risk of weakening of the ozone layer as a result of the discharge of fluorocarbons, although in the future attention must also be given to other halogenated compounds which may reach the stratosphere. Should the discharge of fluorocarbons continue at the present rate, this should eventually lead to a decrease in the total ozone content by approximately 10%. For the time being there are no anthropogenically caused changes in the total ozone content. Numerical modeling indicates the existence of latitudinal and seasonal variations which must be taken into account in estimates of the consequences of a decrease in ozone content for man's health and the environment. There is a need for continuing and expanding programs for investigating all the main aspects of the problem, including numerical modeling, long-term global monitoring and laboratory measurements. A priority item is the monitoring of the ozone concentration at altitudes greater than 35 km where it is most responsive to anthropogenic effects. M.G.

N84-27181# Joint Publications Research Service, Arlington, Va.
MODELING SEASONAL EVOLUTION OF THERMAL REGIME OF OCEAN-ATMOSPHERE SYSTEM Abstract Only c47
B. A. Kagan, V. A. Ryabchenko, and A. S. Safray *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 7 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 48-56 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

A thermodynamic model of the ocean-atmosphere system is proposed which is used in reproducing the seasonal evolution of the thermal regime of this system and clarifying the role of individual factors controlling its variability. In formulating the model the point of departure is traditional concepts concerning the nature of meridional circulation in the ocean. It is assumed that in the middle and low latitudes there is a slow upwelling of water regulated by receipt of cold deep waters from the high latitudes. Adhering to this scheme, two regions are defined: the region of the temperate and low latitudes (upwelling region) and the region of formation of cold deep waters in the high latitudes (taking into account that in the upwelling region where ocean heating occurs the upper quasi-homogeneous layer and the deep layers are separated from one another by a sharply expressed thermocline, whereas in the region of formation of cold deep waters the thermocline is degenerate as a result of intensive ocean cooling). Two zonal regions are similarly defined in the atmosphere: the region of the temperate and low latitudes, extending over the upwelling region and the land adjacent to it, and the high latitudes region situated over the remaining part of the land, the region of formation of cold deep waters and the polar region of the ocean, covered with ice. It is shown that the climatic characteristics obtained using the model agree rather well with observational data. Author

N84-27182# Joint Publications Research Service, Arlington, Va.
TURBULENT PULSATIONS OF HORIZONTAL AND VERTICAL WIND VELOCITY COMPONENTS IN CLOUDS OF DIFFERENT GENERA Abstract Only c47
I. P. Mazin, V. I. Silayeva, and M. A. Strunin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 8 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), no. 1, Jan. 1984 p 10-18 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Turbulence measurements in clouds required development of special instrumentation for continuous registry of fluctuations of the longitudinal wind velocity component (pneumoanemometer) and fluctuations of the vertical wind velocity component (anemoclinometric sensor of angle of attack in combination with a system for measuring aircraft motion). The resolution in the frequency range from 0.06 to 1 Hz was not less than 0.1 m/sec with a relative measurement error 8% for the horizontal (longitudinal) and 7% for the vertical fluctuation components. It was found that there is an intermittence of quiet and turbulent zones and the patterns of distribution of the lengths of these zones in clouds of different genera were determined. The degree of anisotropy of wind fluctuations and the peculiarities of structure of different types of convective clouds are discussed, with particular attention to embedded Cu. In turbulent sectors the distribution of fluctuations of wind velocity components is close to normal. The degree of anisotropy of wind fluctuations was investigated and it was found that it can be great in individual sectors. On the average for all sectors for stratiform clouds wind fluctuations are isotropic, whereas for convective clouds they are anisotropic. Author

N84-27183# Joint Publications Research Service, Arlington, Va.
DENSITY, SPECIFIC HUMIDITY AND WATER VAPOR ELASTICITY ABOVE CONDENSATION LEVEL Abstract Only c47
M. P. Arveladze, G. K. Sulakvelidze, and Ya. G. Sulakvelidze *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 8-9 Transl. into ENGLISH from Soobshch. Akad. Nauk Gruzinskoy SSR (USSR), v. 112, no. 2, Nov. 1983 p 305-308 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The change in specific humidity, elasticity and density of water vapor above the condensation level was studied on the following assumptions: at all altitudes above the condensation level the water vapor in a cloud is in a saturated state; the ascent of air occurs in conformity to the moist adiabatic law; the condensed water droplets and ice particles do not fall from the air volume in which their condensation or sublimation occurred. Equations are derived for the elasticity of saturated water vapor at any altitude z, for water vapor density and for specific humidity above the condensation level. These equations make it possible to conclude that the parameters characterizing humidity in a convective cloud above the condensation level are dependent on temperature at the condensation level and the altitude above this level. With ascent above the condensation level a decrease in specific humidity occurs not only due to the condensation of water vapor, but also as a result of change in water vapor density with altitude. With these considerations taken into account, an expression is derived for the density of water vapor at the altitude z during adiabatic ascent and in the absence of condensation. It is then possible to compute the condensed water above the condensation level.

Author

N84-27184# Joint Publications Research Service, Arlington, Va.
RADIATIVE HEAT EXCHANGE IN ATMOSPHERE DISTURBED BY VOLCANIC ERUPTION Abstract Only **c46**
K. Ya. Kondratyev and N. I. Moskalenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 9-10 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 4, Feb. 1984 p 799-801 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The pecularities of radiative heat exchange in an atmosphere disturbed by an evolving gas-dust cloud arising as a result of a volcanic eruption are examined. The air mass disturbed by volcanic products has a high concentration of CO2, SO2, CH4 and also a considerable turbidity caused by aerosol of volcanic origin. Under the influence of diffusion of air mass circulation the air mass is rapidly propagated and, through gaps in the tropopause formed by powerful ascending flows, enters the stratosphere and forms a stratospheric aerosol with time-evolving optical and structural characteristics. The most significant changes are caused by volcanic aerosol in the radiation regime of the stratosphere in the altitude range 20 to 30 km. The principal volcanic effect on radiative heat exchange is cooling of the Earth's surface and troposphere. This cooling effect is intensified due to a decrease in the greenhouse effect of tropospheric water vapor and an increase in the glaciation zone and movement of the ice cover into the lower latitudes. There is also an intensification of precipitation with an increase in atmospheric turbidity.

Author

N84-27185# Joint Publications Research Service, Arlington, Va.
SELF-SIMILAR REGIMES OF NONSTATIONARY TURBULENT CONVECTION Abstract Only **c46**
A. Yu. Benilov and M. Kh. Rozovskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 15 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 944-949 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Well-developed turbulent convection was studied in order to clarify various self-similar regimes of nonstationary turbulent convection. In describing these regimes it is possible to use the approaches developed in turbulence theory and the theory of the atmospheric surface layer. Different regimes of penetrating turbulent convection are examined in the absence of a mean shear current. Density stratification in a fluid is determined only by temperature changes, the influence of salinity being neglected. The following assumptions and simplifications are also made in formulation of the problem. The random fields of temperature and velocity fluctuations are considered, as in atmospheric surface layer theory, as statistically homogeneous in horizontal planes, but in contrast to surface layer theory are considered to be statistically nonstationary. At the initial moment in time ($t = 0$) all the fluid is in a state of rest and has a temperature constant in depth. With times $t < 0$ the fluid is cooled from the surface, giving rise to a zone of convective turbulent mixing propagation from the surface into the depth of the fluid. In this formulation the problem is solved using the semiempirical theory of turbulence.

Author

N84-27186# Joint Publications Research Service, Arlington, Va.
TRAPPED TOPOGRAPHIC WAVES IN BALTIC SEA Abstract Only **c48**
L. A. Talpsepp *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 16 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 928-931 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The theory of waves trapped by the bottom was first proposed by P. Rhines. The theory was first formulated for small slopes, but topographic waves trapped by the bottom also arise when there are considerable bottom slopes. Many theoretical and experimental studies have dealt with shelf waves in a stratified ocean, but the literature contains nothing indicating that such waves, trapped in a vertical direction (by the bottom) and in a horizontal direction (by the slope), can also exist in the open ocean where there is a considerable bottom slope and the sea is not homogeneous. These phenomena are examined for the open part of the Baltic Sea. A characteristic feature of the topographic waves detected by current velocity measurements there is that they are trapped by topography, by the slope in a horizontal direction and the bottom. The evidence for trapped topographic waves and an interpretation of their behavior are presented.

Author

N84-27187# Joint Publications Research Service, Arlington, Va.
GENERALIZED SPECTRA OF SLIGHTLY NONLINEAR ROSSBY WAVES Abstract Only **c34**
G. M. Reznik and T. E. Soomere *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 17 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 923-927 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

An important feature of the evolution of systems of slightly non-linear Rossby waves is an intensive transfer of energy to the zonal component of movement, that is, to wave vectors having a predominantly meridional direction. The spectrum of a stationary zonal flow, proportional to the Dirac delta equation, is shown to be a solution of the kinetic equation for Rossby waves. An equation is derived describing the evolution of the spectrum of waves against the background of zonal flow, as well as an equation for the entropy of such a system. The intensive transfer of energy to wave vectors predominantly of a meridional direction is thought not to contradict the tendency of the system to thermodynamic equilibrium.

R.S.F.

N84-27188# Joint Publications Research Service, Arlington, Va.
SEASONAL VARIABILITY OF SURFACE CURRENTS IN WORLD OCEAN Abstract Only **c48**
A. L. Brekhovskikh, Yu. L. Demin, and T. V. Shakhanov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 18 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 917-922 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Maps of annual variations in ocean currents are presented. Ocean temperature and salinity data were smoothed with a Tuckey filter and computations were made using the Sarkisyan quasi-geostrophic model. The maps cover the entire Earth and preclude the need for extrapolation.

R.J.F.

N84-27189# Joint Publications Research Service, Arlington, Va.
FRACTIONATION OF CHEMICAL ELEMENTS AT OCEAN-ATMOSPHERE INTERFACE Abstract Only **c47**
A. A. Bezborodov, L. V. Yeremeyeva, and S. V. Lishenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 18-19 Transl. into ENGLISH from Kodl. Akad. Nauk Ukr. SSR,

Ser. B: Geol., Khim. i Biol. Nauki (Kiev), no. 1, Jan. 1984 p 6-9 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MMF A01

The macrocomponents of the salt composition in the ocean surface microlayer (SML) were investigated along with their interrelationships. Chemical fractionation processes at the ocean atmosphere interface are also described. Air bubbles, rising to the surface from the lower water layers, were demonstrated to be a primary mechanism of exchange of matter between the ocean and atmosphere. The SML was shown to be enriched to varying degrees by Ca, So4, trace elements, an Na. Molecular diffusion appears to be a key transport mechanism in SML enrichment. R.S.F.

N84-27190# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF WIND ON RATE OF GAS EXCHANGE THROUGH OCEAN-ATMOSPHERE INTERFACE Abstract Only c46
F. G. Batrakov, V. N. Yeremeyev, and A. D. Zemlyanoy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 19-20 Transl. into ENGLISH from Dokl. Akad. Nauk Ukr. SSR, Ser. B: Geol., Khim. i Biol. Nauki (Kiev), no. 1, Jan. 1984 p 3-6 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The rate of gas exchange between the ocean and the atmosphere as a function of wind velocity was investigated. The vertical distribution of the inert radioactive gas radon-222 in ocean waters was examined. The method used to measure the radon concentration in the vertical distribution is described. The rate of gas exchange was demonstrated to be dependent upon wind velocity. R.S.F.

N84-27191# Joint Publications Research Service, Arlington, Va.
FLUCTUATION OF VELOCITY DISTRIBUTION UNDER INFLUENCE OF SUSPENDED PARTICLES ON TURBULENCE IN BOTTOM CURRENT Abstract Only c46
V. I. Samolyubov, S. V. Galkin, and A. A. Zelenov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 21 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1188-1197 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The transformation of the vertical structure of the velocity field in a deep natural body of water was investigated. Measurements were made 'in situ' with photonephelometers, thermistors, and sensors designed to assess the modulus of current velocity and its fluctuations. A density stratification was ensured by an increased concentration of suspended particles. Stratified flow, water currents, turbulence, mass transfer, and energy transfer are discussed in terms of interrelationship. R.S.F.

N84-27192# Joint Publications Research Service, Arlington, Va.
SOME CHARACTERISTICS OF RADIATION FIELD IN MEDIUM WITH FLUCTUATING OPTICAL PARAMETERS Abstract Only c47
I. L. Katsev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 22 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1172-1179 Original language document was announced as A84-19537 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The small angle approximation is used in solving the problem of the propagation of radiation in a medium in which the attenuation and scattering coefficients fluctuate. The characteristics of the average light field are determined. These include the total flux, the optical transfer function, and the dispersion of the angular distribution of the radiation intensity and of the spread function. Formulas are derived for the space spectrum and the dispersion of the illuminance fluctuations in the medium. C.R. (IAA)

N84-27193# Joint Publications Research Service, Arlington, Va.
SHELF WAVES IN PRESENCE OF CURRENTS AND STABILITY OF BOUNDARY CURRENTS Abstract Only c48
V. V. Yefimov and I. V. Fayn *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 22-23 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1288-1294 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Long trapped waves, including continental shelf waves and Rossby waves, play an important role in the dynamics of boundary regions of the oceans. The propagation of shelf waves in the presence of a barotropic shear current and horizontal friction in a semi-infinite rotating ocean with a cylindrical shelf and a linear shore is investigated. Examples of the propagation of shelf waves in the Strait of Florida and in the Kuroshio Current are examined. Horizontal friction was shown to result in a loss of stability of the boundary current relative to barotropic shelf oscillations for flows bounded to the left by a coast in the Northern Hemisphere. R.S.F.

N84-27194# Joint Publications Research Service, Arlington, Va.
ASYMPTOTIC FORM OF SOLUTION OF PROBLEM OF SEASONAL EVOLUTION OF THERMAL REGIME IN OCEAN Abstract Only c48
N. B. Maslova and V. A. Ryabchenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 23-24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1328-1331 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The thermal regime of the deep layers of the ocean is stabilized over the course of many hundreds of years. A model which applies asymptotic analysis in the calculation of long period temporal evolution of the ocean thermal regime is presented. The time scale for stabilization of the ocean temperature distribution is discussed. Asymptotic formulas were derived and employed to compute the seasonal evolution of temperature and thickness of the ocean upper quasi-homogeneous layer (UQL). R.S.F.

N84-27195# Joint Publications Research Service, Arlington, Va.
FORMING OF UPPER HOMOGENEOUS LAYER IN MEDITERRANEAN BASIN Abstract Only c48
Yu. A. Ivanov, Ye. A. Plakhin, and V. I. Byshev *In its* USSR Rept.: Earth Sci. (JPRS-UES-04-004) 18 May 1984 p 24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1312-1317 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The formation of the upper homogeneous layer is examined for different basins of the Mediterranean Sea, taking its specific hydrophysical regime into account. In the Mediterranean, with some initial vertical distribution of temperature and salinity in the surface layer, and also with a definite intensity and duration of surface cooling in winter, favorable conditions can arise for density mixing to maximum depths. By indirect hydrological methods it is possible to estimate the depths of penetrating convection. A map is compiled to show the maximum depths of penetrating convection. The results of a numerical experiment with a model of nonstationary thermohaline structure of the upper layer are presented. Using the numerical model it is possible to obtain a good correspondence between the numerical results and diagnostic computations made on the basis of the mean field of temperature and salinity and data from specific expeditions. M.A.C.

N84-27196# Joint Publications Research Service, Arlington, Va.
CROSS-SPECTRAL ANALYSIS OF ATMOSPHERIC PRESSURE MICROFLUCTUATIONS AND LOW-FREQUENCY SEA LEVEL CHANGES Abstract Only c47
V. S. Bychkov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 25 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 57-64 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The synchronous registry of atmospheric pressure and level changes of the sea are described. The synchronous records of the processes are of the analog type, continuous, with a vertical scale making possible the simultaneous registry of fluctuations

with periods from 5 minutes to 24 hours. High linear coherence coefficients and minimum phase shifts between these processes are observed in the high frequency part of the spectrum of fluctuations. The nonlinear transfer of energy between these processes is investigated and an explanation is given for the observed effects. The difference in the velocity of propagation of long waves in the ocean (300 m/sec) and atmosphere (170 m/sec) is related to the presence of a nonresonance energy flux from one medium to the other. M.A.C.

N84-27197# Joint Publications Research Service, Arlington, Va.
SUPERCRITICAL REGIMES IN ROSSBY WAVE PROPAGATION Abstract Only **c34**
A. P. Mirabel *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 25-26 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 3-9 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The barotropic instability of Rossby wave motion is examined. The results of investigations of instability in Rossby wave motion are applicable to a description of zonal jet flows in the atmosphere and ocean. On the basis of the qualitative similarity of the physical patterns of secondary motion accompanying Rossby wave instability and jet like motions in the atmosphere and in the open ocean it is possible to relate the generation and intensification of jets to the effect of instability of a planetary wave. Using a three mode approximation, the nonlinear stability of a barotropic Rossby wave propagating amidst a constant current is analyzed. A nonlinear dynamic system in amplitude phase variables which allows a closed solution in the form of elliptical functions is formulated. An unstable case is analyzed which corresponds to a predominance of nonlinearity over dispersion and approximation formulas for the solution are obtained for this case. A qualitative analysis of stationary states of the system is performed. M.A.C.

N84-27198# Joint Publications Research Service, Arlington, Va.
QUASIBIENNIAL CYCLE OF THERMODYNAMIC ATMOSPHERE-OCEAN INTERACTION IN NORTH ATLANTIC Abstract Only **c47**
B. A. Nelepo, V. V. Yefimov, and A. A. Sizov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 26-27 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 4, Feb. 1984 p 922-925 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The quasibiennial cycle of atmosphere ocean interaction is made using archives of hydrometeorological data. Winter and summer situations are examined. Data relating to one of the phases of the quasibiennial cycle (westerly or easterly) are selected for analysis of the entire archives. The mean temperature of the upper 200-m layer of the ocean is computed. Surface pressure, cloud cover and surface temperature are used in the analysis. There is a very significant difference in the thermodynamic characteristics of the boundary layers of the atmosphere and ocean in the westerly and easterly phases of the cycle. M.A.C.

N84-27199# Joint Publications Research Service, Arlington, Va.
MAGNETOHYDRODYNAMIC GENERATOR HELPS PREDICT EARTHQUAKES Abstract Only **c46**
In its USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 29 Transl. into ENGLISH from Sov. Kirgiziya (USSR), 3 Mar. 1984 p 4 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Investigations of the Earth's deep layers using a magnetohydrodynamic (MHD) generator are examined. The apparatus sends very strong (up to 2,000 A) electric current pulses into the Earth for a distance of 40 or more kilometers. Passing through different rocks, the discharge makes it possible to obtain data on their resistivity and to detect dangerous sectors among them. The possibility of this is related to the fact that the deformation of rocks prior to an earthquake changes to a lesser degree than their resistivity. A variety of seismic, geomagnetic, electrometric and seismogeochemical observations are made. These include the changes in the seismic regime, magnetic fields, variations in the chemical and gas composition of ground water. A map of seismic regionalization of the republic is constructed on the basis of the multisided investigations. It defines zones of possible occurrence of strong earthquakes and also less seismically active regions favorable for further exploitation. M.A.C.

N84-27200# Joint Publications Research Service, Arlington, Va.
DESCRIPTIVE STATISTICAL MODEL OF EARTHQUAKE FOCAL RADIATION AND ITS APPLICATION IN EVALUATING SHORT-PERIOD STRONG MOVEMENT Abstract Only **c46**
A. A. Gusev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 32 Transl. into ENGLISH from Vulkanol. i Seysmologiya (Moscow), no. 1, Jan. - Feb. 1984 p 3-22 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Simple statistical models are used in obtaining preliminary evaluations of the spectrum in a wide frequency band for the prediction of strong movements. Data from the literature is used in deriving a law for the scaling of the focal spectra of earthquakes in a wide frequency band. The principal features of this law are an absence of similarity and the presence of two characteristic frequencies (approx. 0.2 and 3-10 Hz). The mean power flux of short-period radiation from the surface of the focus is weakly dependent on magnitude. The flux is relatively low for the foci of major earthquakes. Formulas are derived for determining the static and wave fields of accelerations near an incoherent focus from the focal spectrum and magnitude distance acceleration or intensity computational expressions are obtained on their basis. These expressions agree well with the empirical data. M.A.C.

N84-27201# Joint Publications Research Service, Arlington, Va.
UNIQUENESS OF INVERSE PROBLEM IN GRAVIMETRY FOR HOMOGENEOUS POLYHEDRONS Abstract Only **c46**
M. A. Brodskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-04-004) 18 May 1984 p 33-34 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 12, Dec. 1983 p 60-67 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

A proof of the uniqueness theorem for polyhedrons using methodology more complex and unwieldy than for plane polyhedrons, but adhering to the logic in the first investigation was presented. The basis for the proof is the equality of internal potentials under the condition of equality of external potentials of the bodies. The analytical approach of the direct three dimensional potential problem, investigated in a number of other studies is used here in solving the inverse problem. B.G.

N84-27202# Joint Publications Research Service, Arlington, Va.
SOLUTION OF DIRECT PROBLEM IN GRAVIMETRY ON SPHERICAL EARTH Abstract Only **c43**
V. I. Starostenko and A. G. Manukin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 34 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 12, Dec. 1983 p 34-49 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

In making computations which are used in constructing density models of the crust and upper mantle on the basis of the observed gravity field it is usually assumed that the Earth's surface is flat. In order to facilitate allowance for the Earth's sphericity in such work two algorithms for solving the direct gravimetric problem for geopotential and its derivitive in a radial direction on a spherical Earth for a three dimensional body, inhomogeneous in depth, bounded by spherical coordinate surfaces are proposed. This is essentially a generalization for an Earth of nonuniform radius. One of the algorithms is characterized by exceptional accuracy (a comparison is made of the gravitational effects of bodies which are considered analogs of one another for spherical and flat earths). These algorithms are intended for constructing density models of large structures on the Earth or other planets on the basis of their gravitational fields. B.G.

N84-27203# Joint Publications Research Service, Arlington, Va.
SEISMICITY AS STOCHASTIC PROCESS WITH PHYSICAL PARAMETERS Abstract Only c46
K. I. Kuznetsova *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 35 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 12, Dec. 1983 p 16-28 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Although the seismic process is such a highly important physical process, the seismic regime, the totality of seismic events, traditionally described by quantitative parameters not having a physical content. In order to rectify this situation a model of the seismic process is outlined as a series of states of an inhomogeneous medium characterized by an instantaneous distribution of the probabilities of sizes of fractures. A discussion of the conditions exerting an influence on the parameters of the curve of frequency of recurrence of earthquakes and their variation in time and space is presented. The model proposed here as the point of departure contains a representation of some volume of an inhomogeneous and locally stressed medium (such as a crustal block) in the form of an autonomous ensemble of elements differing in strength which is given the sense of permeability (or transparency) for the propagating fracture. B.G.

N84-27204# Joint Publications Research Service, Arlington, Va.
DEEP GEOPHYSICAL INVESTIGATIONS IN ZONES OF PRESENT-DAY ACTIVE VOLCANISM Abstract Only c46
I. K. Tuyezov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 36 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 118-120 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The structure of the crust and magma hearths in regions of present-day volcanism in the example of Kamchatka are presented. Physical properties, structure of the crust and top of the mantle and magma hearths of other regions of present-day magmatism (Japan, Hawaiian Islands, Iceland) are analyzed. The results of ultrasonic seismic modeling, the pecularities of the method for seismic probing of Kamchatkan volcanoes and the nature of field data and the method for their processing are examined. Finally, the deep structure and magma hearths of Kamchatka are considered in detail. Extensive data on the physical properties of magma and zones of partial melting of rocks according to data in the literature and observations are given. The materials indicate that the attenuation of seismic wave energy increases sharply at a temperature of about 1200 C and the velocites of seismic wave propagation decrease considerably; with an increase in temperature up to 1000 C resistivity decreases by several orders of magnitude, and by several orders of magnitude more in melts. B.G.

N84-27205# Joint Publications Research Service, Arlington, Va.
LOCAL GRAVITY ANOMALIES AND CRUSTAL DENSITY INHOMOGENEITIES IN SOUTHERN KURILE ISLANDS Abstract Only c46
V. Yu. Kosygin and Yu. A. Susekov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 37 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 105-108 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Surface seismic work carried out by Sakhalin geophysicists during recent years in the Southern Kurile Islands and experimental and methodological gravimetric observations made along three profiles intersecting Kunasir Island and one profile run along the southern part of the island are described. In addition, observations were made on a regional profile. These and other observations revealed a marked differentiation of gravity anomalies, this serving as a basis for defining density inhomogeneities in the crust. Maps of residual anomalies for Kunasir and Shikotan Islands are shown. Due to the first time to map and quantitatively compute a series of well-expressed inhomogeneities in the density of rocks in the upper part of the Earth's crust in the Southern Kurile Islands, a correlation between the nature of the gravity fields and the history of geological development of the lesser and greater island arcs was found. B.G.

N84-27206# Joint Publications Research Service, Arlington, Va.
GEOPHYSICAL AND TECTONIC CHARACTERISTICS OF MONGOLIAN-OKHOTSK SEISMIC ZONE Abstract Only c46
S. V. Gorkusha and L. A. Mastyulin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 37-38 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 52-56 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The structure of the epicentral field of earthquakes in the Mongolian-Okotsk seismic zone were ascertained and its correlations with deep structure of the crust and mantle were determined. The territory involved is western Mongolia, the Baykal region, Transbaykalia and the USSR Far East. Maps of Epicenters and density of the logarithm of earthquake density were constructed for the investigated territory. The Mongolian-Okhotsk seismic zone is spatially linked to a very large arched structure and is a reflection of its development at the present time. The most important factor governing the tectonic life of this structure is a gigantic lens of the anomalous mantle with a high temperature and viscosity. Despite the unified global sources of development of the entire Mongolian-Okhotsk seismic zone, the nature and position of the structural elements making it up (seismic systems and aseismic windows) are governed by the inhomogeneous structure of the upper crustal horizons. B.G.

N84-27207# Joint Publications Research Service, Arlington, Va.
SEISMIC MODEL OF EARTH'S CRUST IN SOUTHERN SEA OF OKHOTSK REGION AND SOME RESULTS OF ITS GEOLOGICAL INERPRETATION Abstract Only c46
K. F. Sergeyev, V. V. Argentov, and S. K. Bikkenina *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 38-39 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 3-12 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

A description of the principal features of crustal structure in the southern Sea of Okhotsk along a very representative geotraverse. Since 1957 there was a great number of deep seismic soundings along five profiles, considerably supplemented by work by the reflected waves, method, as well as detailed seismic investigations by the correlation method of refracted waves, reflected waves method in the common deep point modification and continuous seismic profiling, thus making it necessary to integrate all these data. Emphasis here is on the data for profiles 1-M and 1-0, where in the upper lithosphere a new seismic boundary with a boundary velocity of 7.0 to 7.1 km/sec was discovered. The results indicate that the Earth's crust exhibits extremely significant changes in the direction from Eurasia to the Pacific Ocean with respect to both thickness and internal structure. On the basis of these parameters it is possible to define several crustal geoblocks. B.G.

N84-27208# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF VELOCITY ON DEPTH DETERMINED FROM TRAVEL-TIME CURVES OF REFRACTED WAVES IN RANDOMLY INHOMOGENEOUS MEDIA Abstract Only c34
N. V. Petersen *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 39-40 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 95-100 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The influence of local velocity inhomogeneities on the travel-times of refracted waves and the dependence of velocity on depth determined from them was investigated. A clarification of the principal laws of wave propagation in media containing local velocity inhomogeneities is sought using a stochastic model of the medium in which the velocity values are separated into deterministic and random components. The dependence of apparent velocity on distance determined from the mean travel-time curve, differs from the similar dependence of the deterministic travel-time curve: near

the source the apparent velocities are exaggerated by a value a little less than the contrast of the velocity inhomogeneities, whereas at greater distances the apparent velocities are understated. B.G.

N84-27209# Joint Publications Research Service, Arlington, Va.
ECONOMICAL DIFFERENCE METHODS FOR SOLVING DIRECT PROBLEMS IN GRAVIMETRIC AND MAGNETIC PROSPECTING Abstract Only **c46**
P. N. Vabishchevich and P. A. Pulatov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 40 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 68-76 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

A method is proposed for the solution of direct problems in gravimetry and magnetometry based on solution of Dirichlet difference problems for the Poisson equation in the selected region. An effective computation scheme is developed for solution of direct problems for bodies of an arbitrary configuration and variable density. The algorithm, given here in detail, was tested in solution of a number of model problems. Although the algorithm is written up for a plane (two dimensional) problem, it could easily be adapted to a three dimensional case, although the solution of the latter requires a far larger computer memory. The merits of the algorithm include the following: (1) possibility of finding both external and internal fields; (2) possibility of solution of direct problems with arbitrary laws of density distribution in regions of arbitrary configuration. Accordingly, it is suggested that the proposed algorithm will have a broad field of applicability, particularly in the interpretation of data from surface and borehole (mine) observations in ore geophysics. Author

N84-27210# Joint Publications Research Service, Arlington, Va.
DENSITY INHOMOGENEITIES IN UPPER MANTLE OF EASTERN INDIAN OCEAN Abstract Only **c48**
N. V. Petersen and S. M. Golynskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 40-41 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 55-67 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Little was published concerning the structure of the upper mantle beneath the Indian Ocean. Sufficient data are now available for preparing a description. Crustal thickness is known quite well and on the 19th cruise of the Akademik Vernadskiy new information was collected on the gravity field, which here is used together with data published by R. S. Detrick, et al. in JGR, Vol 84, B12, pp 3637-3653, 1979, where information along four profiles is given. During the Akademik Vernadskiy expedition free-air anomalies were measured along four different profiles intersecting the Bay of Bengal, East Indian Ocean Ridge and the Sunda island arc, the total length of these profiles being 6,600 km. The reference point for model delta g curves had a value -560 mgal. Since information was desired on the anomalous masses beneath the M discontinuity, the residual anomalies were analyzed. They were obtained by subtracting the gravitational effect of the oceanic crust, tied in to the zero level (-560 mgal), from the observed field. A heterogeneous structure of the upper mantel in the eastern part of the Indian Ocean with both normal and anomalous density values was revealed. B.G.

N84-27211# Joint Publications Research Service, Arlington, Va.
RAY TRAJECTORIES IN STOCHASTIC MEDIA WITH LINEAR DEPENDENCE OF DETERMINISTIC VELOCITY COMPONENT ON DEPTH Abstract Only **c34**
N. V. Petersen and S. M. Golynskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 41-42 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 46-54 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The authors investigated the influence of random inhomogeneities of a medium along the ray trajectory, a problem of fundamental importance because real geological media are essentially inhomogeneous. In solving direct and inverse problems in seismics the medium is usually approximated by quite simple models which fail to take into account the influence of local inhomogeneities of the medium on wave propagation. In order to clarify the patterns of wave propagation in inhomogeneous media the authors here propose a two-dimensional model of a stochastic medium in which the velocity of wave propagation is divided into deterministic and random components: v(x,z) - V(z) + delta V(x,z). The deterministic component V(z) varies only with depth in the direction z and describes the regional properties of the medium. The random component deltaV(x,z) is governed by the presence of local inhomogeneities which are characterized by the correlation coefficient N(r) and the contrast of velocity fluctuations. B.W.

N84-27212# Joint Publications Research Service, Arlington, Va.
SPHERICAL WAVE REFRACTION WITH SHORT DISTANCES OF SOURCE FROM INTERFACE Abstract Only **c34**
I. D. Tsvankin, A. V. Kalinin, and B. L. Pivovarov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 42 Transl. into ENGLISH from Izv. Akad. Nauk SR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 32-45 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

If a source of seismic waves is situated a short distance from an interface there will be a considerable contribution to the field of the refracted wave from inhomogeneous waves excited by the source. This results information of a system of low-frequency nonuniformly refracted and outflowing waves, constituting the subject of this article. Investigation of the system of nonuniformly refracted and outflowing waves for a case when the source is in a high-velocity medium revealed that the polarization of nonuniformly refracted waves and the homogeneous components of the outflowing waves is close to linear. With increasing distance between the source and interface the amplitudes of these waves decrease rapidly. The authors give an in-depth analysis of the phenomenon for two cases: (1) plane interface of two fluid half-spaces, (2) plane interface of two elastic half-spaces. The article constitutes the first systematic analysis of the dynamic and kinematic characteristics of these types of waves. Comprehension of this phenomenon will prove useful in seismological and borehole investigations, particularly in seismic prospecting and especially when waveguides are present in the section. Author

N84-27213# Joint Publications Research Service, Arlington, Va.
DICREPANCIES IN KINEMATIC PARAMETERS OF EARTHQUAKES ACCORDING TO OBSERVATIONS BY REGIONAL AND WORLD NETWORKS OF STATIONS Abstract Only **c46**
I. V. Gorbunova and A. I. Pastorov *In its* USSR Rept.: Earth Sci. (JPRS-UES-04-004) 18 May 1984 p 43 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 22-31 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The discrepancies between hypocenters determined on the basis of observational data from the regional and world networks of stations are analyzed for the Central Asia region. It is shown that only regional stations, outfitted with high-response instrumentation, are capable of properly registering the initial point of the destruction process at an earthquake focus. However, teleseismic data can be used with necessary corrections for depth and t sub 0. This can be done by several methods, one of which is proposed in this article; these methods, however, are complex and time-consuming. There is a full discussion of the errors in determining earthquake parameters when using data registered at distant stations resulting from the loss of the first arrivals when registering P waves. Thus, the hypocenters according to data from the world network are 17 km deeper and the focal times are 1.9 sec greater than according to data registered at regional stations. It is clear that in order to determine hypocenters in the world network of stations with a regonal accuracy it is necessary that data be used from a reference network of stations equipped with high-response instruments capable of registering oscillations from earthquakes with m approx. 4.5, since earthquakes even with M > or = begin precisely from this energy level. Author

N84-27214# Joint Publications Research Service, Arlington, Va.
EXCITATION OF SPHEROIDAL OSCILLATIONS IN VISCOELASTIC EARTH Abstract Only c46
S. Ts. Akopyan *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 43-44 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 3-16 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

It was demonstrated in previous articles that aperiodic motions arise together with attenuating oscillations. In another article (IZV, AN SSSR: FIZIKA ZEMLI, No 8, 1978) the same authors investigated aperiodic signals for the very simple case of torsional oscillations of a homogeneous model of the Earth. Continuing this work, S. Ts. Akopyan gives a formulation and solution of the problem of excitation of spheroidal oscillations in a viscoelastic Earth by a point source. The excitation of the spheroidal oscillations is examined in one-, two- (liquid core - mantle) and three-layer (solid core - liquid core - mantle) viscoelastic models of the Earth having a constant density and Lame step functions. A very detailed examination is made of the appearance of aperiodic signals accompanying the excitation of radial oscillations in a viscoelastic homogeneous Earth with different rheology. Three types of volumetric and shear inelasticity were examined: standard linear body--creep function of an exponential type, rheology with creep power functions and a Lomnits body, described by a logarithmic creep function. B.W.

N84-27215# Joint Publications Research Service, Arlington, Va.
POSSIBLE INTERPRETATION OF DISCREPANCY IN RESULTS OF ABSOLUTE GRAVITY DETERMINATION AT SEVRES Abstract Only c46
M. U. Sagitov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 44 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 2, Jan. 1984 p 300-304 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

At Sevres, as at any other observatory, pedestals, columns and walls create a nonuniformity of the gravity field in the room where measurements of absolute gravity are made. The neglecting of this gravitational field nonuniformity can result in errors which multiply exceed the accuracy in measuring absolute gravity which is usually cited. There are two ways in which this nonuniformity is reflected. First, due to the vertical gravity gradient delta g/delta z there is a change in the length of the path traversed by the test body during free falling. Second, due to the vertical gravity gradient errors arise in the reduction of the measured absolute gravity value to some point in space. These factors are taken into account here in examining the results of absolute gravity determinations at the International Bureau of Weights and Measures at Sevres, where Italian, Russian and Chinese instruments were used on the same pedestal (American and French instruments were on a different pedestal). The free falling method was used. Allowance for the above-mentioned factors gave an improvement in the convergence of results. B.W.

N84-27216# Joint Publications Research Service, Arlington, Va.
NATURE OF 640-KM SEISMIC BOUNDARY Abstract Only c46
L. P. Vinnik *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 45 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 4, Jan. 1984 p 296-299 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The boundary separating the upper and lower mantle can be attributed either to a phase transition or a change in the chemical composition of matter. The author here contends that the first of these hypotheses is consistent with the latest seismic investigations. The results of studies of the phase transitions in olivine and in the pyroxene-garnet components of mantle matter at high pressures and a temperature of 1000 C have shown that in the olivine component at a depth of 500 km there is a transition to the spinel phase, which at 720 km decays into perovskite and rock salt structures. The phase transitions in the pyroxene-garnet component are completed with transition to a perovskite structure at 600 km. Against this background, new seismic investigations can be interpreted to support the thesis of a phase transition origin of the 640-km discontinuity. This research included work in southern Norway and the western United States, but most importantly, Russian analysis of observations of exchange, longitudinal and surface waves. The latter study, with an error of only a few kilometers, fixes the transition boundary at 640 km. Many significant conclusions can be drawn with acceptance of the phase transition hypothesis. B.W.

N84-27217# Joint Publications Research Service, Arlington, Va.
NEW DATA ON UPPER MANTLE LITERAL INHOMOGENEITIES IN WESTERN EURASIA Abstract Only c46
N. Ya. Kunin and E. R. Sheykh-Zade *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 46 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 273, no. 5, Dec. 1983 p 1087-1090 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

A study was made of all data published up to 1982 concerning the velocity of longitudinal waves along the surface of the upper mantle in Western Eurasia. The data related to 63,000 km of profiles, 53,000 km being first-order profiles. This made it possible to construct a map of V(M) sub b (boundary velocity of longitudinal waves at the Mohorovicic discontinuity). In compiling this map data for second- and third-order profiles were taken into account for regions not covered by first-order profiles. The V(M) sub b data reveal important macroinhomogeneities of the upper mantle. For the main low-frequency inhomogeneity it was possible to discriminate two generalized regions: western, relatively monolithic, with reduced velocities of the upper mantle, and eastern, with relatively high V(M) sub b values. The first includes the central and western parts of the East European Platform, Paleozoic and Alpine regions of Europe outside Russian and the Mediterranean Sea to the west of the meridian 30 E. Here the total range of V(M) sub b values varies from 7.6 to 8.4 km/sec, the mean value on profiles with a total extent of 31,000 km being 8.07 km/sec. B.W.

N84-27218# Joint Publications Research Service, Arlington, Va.
SHOT WAVES IN FROZEN GROUND Abstract Only c46
G. M. Lyakhov and G. B. Frash *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 47 Transl. into ENGLISH from Zh. Prikl. Mekhan. i Tekhn. Fiz. (USSR), no. 6, Nov. - Dec. 193 p 52-57 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Experiments to study shot waves were carried out in sandy and clayey loam ground in its natural bedding under conditions of seasonal freezing to depths of 0.45-0.5 m. Stress measurements were made using piezoceramic transducers with a frequency of oscillations 40,000 Hz with the registry of signals on electronic oscillographs and membrane transducers with a frequency 4000 Hz and registry with loop oscillographs. The sensors and explosive charge were placed at the same depth in shot holes drilled in frozen ground. The holes were refilled and tamped and the experiments were conducted after the ground was frozen. The charges weighed 0.1 kg. The depth of placement of the sensors in sandy ground was 0.4 m at -0.2 C; in clayey loam it was 0.2 m at -0.4 C or 0.35 m at -9.2 C and 0.45 m at a temperature close to zero. Comparison with earlier investigations revealed that the dynamic properties of frozen ground are essentially dependent on the granulometric composition, content of compoents in an initial unfrozen state and on temperature. In frozen water-saturated ground the velocity of wave propagation is greater and the duration of the wave is less than in frozen nonsaturated ground. B.W.

N84-27219# Joint Publications Research Service, Arlington, Va.
NEW VARIANT OF EVALUATION OF PREDICTED PETROLEUM AND AS RESERVES ON GENETIC BASIS Abstract Only c43
A. M. Akramkhodzhayev, A. V. Kirshin, and A. Kh. Nugmanov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 47-48 Transl. into ENGLISH from Uzbek. Geol. Zh. (USSR), no. 5, Sep. - Oct. 1983 p 24-28 (For primary document see

N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The volumetric-genetic method for evaluating potential resources of petroleum and gas is now used indepndently or in combination with geological analogue methods. The different variants of the method are based on a number of concepts concerning changes in the content and composition of bitumoids in the katagenesis zone, determined on the basis of chemical bituminological data. In those variants the computations do not take into account a very high percentage of hydrocarbon products of earlier stages of transformation of organic matter diagenesis and early katagenesis; as a result, the potential reserves of petroleum and gas can be underestimated by 30%. The proposed hydrocarbon balance takes into account not only hydrocarbon products newly formed in katagenesis, as before, but also fluid and gaseous products of earlier stages in the transformation of organic matter, sorbed in its micro- and small pores and desorbing at the onset of mesokatagenesis. The new modification makes it possible an estimate of the potential reserves of petroleum and gas separately and the possible limits of their variation in the basin as a whole. B.W.

N84-27220# Joint Publications Research Service, Arlington, Va.
OPTIMUM DENSITY STRUCTURE OF UPPER MANTLE ALONG JAPAN - SHATSKIY RISE - EMPEROR SEA MOUNTS GEOTRAVERSE Abstract Only c46
V. Yu. Kosygin and V. I. Isayev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 49-50 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 5, Sep. - Oct. 1983 p 27-38 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The authors feel that sufficient materials have now been accumulated to justify a thorough study of the structure of the crust and upper mantle of the Pacific Ocean floor along deep sections (geotraverses) along with all geological information available for a distance + or - 100 km from the axis of the geotraverse is plotted. The authors chose a deep section of the Pacific Ocean floor along the profile Japan - Shatskiy Rise - Emperor Sea Mounts for constructing its optimum density model. There has been a relatively good study along this geotraverse by seismic methods, gravimetric information is available, and the west edge of the geotraverse joins the eastern part of the Sikhote-Alin' - Sea of Japan - Honsu - Pacific Ocean geotraverse, this making it possible to use part of the information from this profile in constructing in a period density model. The joint examination of these two geotraverses as a whole (Sikhote Alin' - Emperor Sea Mounts) in the future will make it possible to represent the overall structure of the upper mantle along a deep section intersecting all the main structures of the northwestern sector of the Pacific Ocean. B.W.

N84-27221# Joint Publications Research Service, Arlington, Va.
ALLOWANCE FOR GEOMAGNETIC FIELD VARIATIONS AND TIE-IN OF OBSERVATIONS IN HIGHLY PRECISE AEROMAGNETIC SURVEYS Abstract Only c43
V. K. Palamarchuk *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 50 Transl. into ENGLISH from Geol. i Geofiz. (USSR), No. 10, Oct. 1983 p 107-114 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Geomagnetic field variations caused by nonstationary external sources constitute the principal interference in a magnetic survey and survey accuracy is therefore for the most part determined by the reliability in evaluating variations and the methods for taking them into account. Corrections for variation are determined by direct or indirect methods, but direct methods are inapplicable in arctic regions. However, delta T sub alpha makes a considerable contribution to total survey error in virtually all regions of the USSR. Whereas earlier it was assumed that delta T ub alpha is determined for the most part by the intensity of variations or the shore effect, in highly precise surveys it is necessary to take into account delta T sub alpha due to inhomogeneity of geological structure of a survey sector; such an effect can exceed the survey error by an order of magnitude. An indirect method should be used for taking variations into account in highly precise surveys. The article examines some variants of these methods which the author developed for highly precise surveys in the high latitudes (but applicable in any regions). The use of any indirect method requires an observation network which is optimum for a particular region. B.W.

N84-27222# Joint Publications Research Service, Arlington, Va.
DETERMINING PARAMETERS OF RADIATING FOCUS FROM AMPLITUDE SPECTRA OF BODY WAVES Abstract Only c34
V. I. Shcheglov and S. I. Isyuk *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 51 Transl. into ENGLISH from Geol. i Geofiz. (USSR), no. 10, Oct. 1983 p 102-106 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The relationship between the parameters of an earthquake focus and the spectral characteristics of radiation in body waves was studied. It was found that the parameter p = W/L (W is the width and L is the length of the rupture plane) is an index of strength of the medium and the isometric character of the rupture plane and exerts a decisive influence on the dynamics of focal radiation. In addition, a study was made of the correlation between the change in rupturing velocities along the length and width of the rupture plane and the behavior of the spectral characteristics V0.5. When p = const with an increase in the ratio tg phi = c(i)/c(W) the radiation spectrum becomes more high-frequency (displacement earthquakes should be more high-frequency than earthquakes with a thrust mechanism). The possibility of determining the rupturing velocities c(i) and c(W) is demonstrated. These velocities can be used an an informative parameter of the seismic process. Author

N84-27223# Joint Publications Research Service, Arlington, Va.
POSSIBLE SOUCES OF IRREGULAR GEOMAGNETIC VARIATIONS Abstract Only c46
V. M. Litinskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 51-52 Transl. into ENGLISH from Geofiz. Zh. (Kiev), vol. 5, no. 6, Nov. - Dec. 1983 p 76-79 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

It is postulated that plasma, moving from the tail of the magnetosphere, reaches closed lines of force. Beginning movement along them, the particles create diamagnetic currents which are directed (looking at the end of the tube from the earth) in a clockwise direction. Therefore, the tube of force is a sort of magnet which will be parallel to the Earth's magnet. The interaction of these magnets is manifested in a mutual repulsion and the tube of force with the moving particles withdraws somewhat. As a result, the base of the bundle of lines of force is displaced northward, which is indicated by poleward motion of auroras at the time of the explosive phase of the substorm. The northward moving tube of force generates an auroral electrojet in the Earth's conducting layes, which in spreading out forms the current system of the substorm. This jet is directed to the east. It is postulated that it is not the magnetic field of the ionospheric current system which causes Earth currents, but instead currents in the Earth create the observed field. Author

N84-27224# Joint Publications Research Service, Arlington, Va.
IONOSPHERIC EFFECT OF PARTIAL SOLAR ECLIPSE OF 31 JULY 1981 Abstract Only c46
Ye. P. Datsko, A. G. Kasymova, and O. I. Maksimenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 52-53 Transl. into ENGLISH from Geofiz. Zh. (Kiev), vol. 5, no. 6, Nov. - Dec. 1983 p 71-76 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Vertical sounding of the ionosphere before, during, and some time after the eclipse was at 1- and 5-minute intervals. Scintillations of radio signals from artificial satellites were registered at frequencies of 150 MHz (3-channel spaced reception), 40 MHz and 180 MHz (single-channel reception). Slant sounding was along the

path Moscow-Kiev in the frequency range from 3.5 to 27.5 MHz. A very strong magnetic storm was registered at the Kiev Magnetic Observatory before the eclipse; this storm which lasted 150 hours was preceded by considerable helioactivity. The solar flares and magnetic storm caused an ionospheric storm with very great delta f(0)F2 deviations. During the eclipse, the usual effect was not registered due to strong helio-geomagnetic activity. The E-region anomalies were observed: a local ionization cloud was formed with a very narrow range of electron concentration, decreasing from the low-frequency end. The F1 layer was formed an hour earlier. The effective recombination coefficient obtained during the period of the eclipse agrees with data from rocket experiments.
Author

N84-27225# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF ELECTRIC FIELDS ON POTENTIAL WAVES IN EARTH'S MAGNETOSPHERE Abstract Only c46
Yu. V. Kyzyurov, A. M. Tupchiyenko, and A. K. Yukhimuk *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 53-54 Transl. into ENGLISH from Geofiz. Zh. (Kiev), vol. 5, no. 6, Nov. - Dec. 1983 p 68-71 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Electric fields E0, parallel and perpendicular to the geomagnetic field were observed in the Earth's magnetosphere by means of satellite probe measurements. These fields are associated with the development of anomalous resistance and double electric layers devoted to an investigation of the influence of such fields on the development of potential disturbances in the Earth's magnetosphere. A linearized system of equations is used for describing the potential waves. Solution of this system gives a dispersion equation for potential disturbances. After rewriting this equation, it was possible to investigate the behavior of ionosonic waves. Analysis of high frequency Langmuir oscillations reveals that the longitudinal and transverse electric fields observed in the magnetosphere from satellites exerts an important influence on the development and propagation of potential disturbances. It is confirmed that the strengthening (attenuation) of waves is dependent on the direction of the wave vector relative to the external electric field.
A.R.H.

N84-27226# Joint Publications Research Service, Arlington, Va.
UNIQUENESS IN PLANE INVERSE PROBLEMS IN GRAVIMETRY AND MAGNETOMETRY Abstract Only c46
V. N. Strakhov and M. A. Brodskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 55 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), no. 5, Dec. 1983 p 1097-1101 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The problem of discriminating classes of distribution of field sources within whose framework the inverse problem has a unique solution is of great theoretical and practical importance. Due to the great analytical difficulty of the problem, it is customary to study a plane (two-dimensional) problem in which it is possible to apply the theory of functions of a complex variable. An earlier application of the methods of the theory of functions of a complex variable in investigating the uniqueness in inverse problems of gravimetry and magnetometry in classes of finite homogeneous simply connected polygons revealed no uniqueness in these clases. An adequately broad class of finite simply connected regions is discriminated in which there is uniqueness in solution of plane inverse problems in gravimetry and magnetometry with an arbitrary (unknown a priori) density (magnetization). A generalization relating to the case of a stipulated polynomial density (magnetization) is also given.
Author

N84-27227# Joint Publications Research Service, Arlington, Va.
EMISSION EFFECTS OF MEMORY IN ROCKS Abstract Only c46
V. V. Rzhevskiy, V. S. Yamshchikov, V. L. Shkuratnik, K. G. Lykov, and V. M. Farafonov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 55-56 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 273, no. 5, Dec. 1983 p 1094-1097 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Development of the destruction process in rocks results in an increase in the activity and level of acoustic emission (AE) and electromagnetic radiation (EMR). These acoustic and effects accompanying the cyclic loading of marble and silvinite-carnallite salts were investigated. In the case of salt, the increase in loading can result in a monotonic increase in AE and EMR, whereas for marble AE and EMR are manifested in the form of individual bursts whose level exceeds the background level by a factor of 2-10. In a loading regime, the times of appearance of EMR and AE impulses coincide, but the activity of the latter is greater. With the second loading up to the maximum load in the first cycle, the AE level is approximately an order of magnitude less than in the preceding cycle, whereas the EMR level is commensurable with the EM background. The phenomena observed should play an important role in recognizing the fundamental relationship between the dynamics of deformation of rocks and their electric properties and also in establishing the physical nature and methods for using the memory of rocks in investigation of their stressed state, in earthquake prediction and in studying dynamic processes in a rock mass.
Author

N84-27228# Joint Publications Research Service, Arlington, Va.
HYDROGEOLOGICAL AND HYDROMETEOROLOGICAL PRECURSORS OF ASHKHABAD CATASTROPHIC EARTHQUAKE Abstract Only c46
M. R. Miikis *In* is USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 56-57 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 273, no. 5, Dec. 1983 p 1091-1094 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Retrospective analysis of variations of ground water table, ground water temperature, soil temperature, air temperature, precipitation, air humidity, and discharge of springs reveals that the Ashkhabad earthquake of 1948 occurred against a background of considerable deviations of a number of hydrometeorological and hydrogeological characteristics in the Ashkhabad region. It is difficult to judge whether meteorological factors exerted an influence on the development of the strong earthquake or whether their anomalous regime was a result of heating of the medium over the focus of the future earthquake. Considerable changes in temperature, ground water level and some hydrometeorological elements in the short period of time providing the strong earthquake merit particular attention. Even the relatively rough measurements of ground water parameters used in the analysis indicate a considerable variation during the period of earthquake preparation and the possibility of their use for detecting the precursors of strong seismic processes.
Author

N84-27229# Joint Publications Research Service, Arlington, Va.
METHOD FOR EVALUATING PARAMETERS OF MAGNETIZED OBJECT OF GREAT HORIZONTAL EXTENT Abstract Only c34
M. S. Zeygelman *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 57-58 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, no. 1, Jan. - Feb. 1984 p 85-94 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

It is convenient to use a class of model bodies, represented by a rectangular parallelpiped in approximating geological objects of a great horizontal extent: large blocks in the Earth's crust, intrusive masses, etc. Methods were developed for evaluating the parameters of a three-dimensional magnetized parallelpiped. A computational experiment was carried out on computer to determine the most stable relationships between the parameters of the model and the characteristics of its field. Problems in evaluating the parameters of localized objects approximated by a parallelpiped are considered. The conditions for the appearance of the equivalence when evaluating the depth of magnetized masses are analyzed. Attention is given to the case of oblique magnetization, such as evaluating of the lower edge and angle of magnetization and determining the position of lateral faces. The practical

application of the method is illustrated in examples of interpretation of observed anomalies. The method can also be employed in selecting initial approximations for optimizing models on an electronic computer. Author

N84-27230# Joint Publications Research Service, Arlington, Va.
POSSIBILITIES OF STUDYING INELASTIC PROPERTIES AND CHARACTERISTICS OF MEDIUM INHOMOGENEITY USING SPECTRA OF SCATTERED WAVES Abstract Only c46
I. V. Karpenko, S. G. Karpenko, A. G. Melman, and L. P. Ilnitskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 58-59 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, No. 1, Jan. Feb. 1984 p 61-70 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The inelastic properties of geological media are studied by the use of sets of waves scattered by deep inhomogeneities of the medium. Averaging the N paths, from which statistically dependent information is subtracted, makes it possible to increase the accuracy in determining the power spectra to a prestipulated accuracy. Algorithms are given for finding this power spectrum for an elementary seismic signal scattered by a small-scale inhomogeneity and an inhomogeneity of a stipulated size. The form of the dependence of the effective attenuation of seismic waves as a function of frequency is theoretically validated and experimentally confirmed. It is found that, at frequencies lower than 20-25 Hz, diffraction scattering is greater than other forms of frequency-dependent losses of seismic energy. An algorithm is presented for determining the scattering function for a small-scale inhomogeneity, the examples of determination of the coefficient of effective attenuation, decrement of effective absorption and scattering function of waves of a small-scale inhomogeneity are cited. Author

N84-27231# Joint Publications Research Service, Arlington, Va.
GEOACOUSTIC METHOD FOR CONTINUOUS MONITORING OF STRESSED-STRAINED STATE OF EARTH'S CRUST Abstract Only c46
T. Z. Verbitskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 59 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, no. 1, Jan. - Feb. 1984 p 55-61 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Ceramic piezoelectric transducers with characteristic frequencies 10-15 KHz are used as sources and detectors of longitudinal waves in a geoacoustic measuring system. The source is excited by an alternating voltage of 150-300 V with a frequency of 1-10 KHz. The electric signals from the detectors are amplified and filtered for discriminating the frequency harmonics. The phase shift of the received signal of the fundamental frequency and the amplitude of oscillations of the fundamental and multiple frequencies are determined. The measured wave parameters are registered on punched tape, facilitating computer input. Measuring system stability is monitored. The supply voltage, as well as atmospheric pressure, humidity and temperature are continuously monitored. Measurements made in the Carpathian Geodynamic Polygon Carpathian reveal a substantial influence of tidal deformations of the Earth. It can be postulated that short anomalies are caused by the discharge of stresses in the investigated rock complex. More prolonged anomalies are caused by deformations of the crust accompanying preparation for tectonic earthquakes. A.R.H.

N84-27232# Joint Publications Research Service, Arlington, Va.
PHYSICAL NATURE OF GEOMAGNETIC MICROBAYS Abstract Only c46
V. M. Litinskiy and F. I. Sedova *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 60 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, No. 1, Jan. - Feb. 1984 p 54-55 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Type of variations resemble baylike disturbances, although in most cases their amplitudes and periods are considerably less. Weak identical disturbances (WID) of the geomagnetic field were identified, based on data for stations separated 120 deg in longitude and 15 deg in latitude. Intervals of disturbances which at longitudinally spaced observatories had a geat similarity of amplitudes and phases were examined. A thorough comparison of the microbays and WID revealed that they are the very same type of variations. If only isolated WID peaks are considered, they correspond to microbays. An example is given. WID (microbays) coincide with sudden commencements of storms, indicating that they have common sources: shock waves of the solar wind. In any study of geomagnetic bays (substorms), it is necessary to take into account the presence of WID which have a similar external appearance but which constitute an independent type of variations. Author

N84-27233# Joint Publications Research Service, Arlington, Va.
STRUCTURE AND DIRECTION OF EVOLUTION OF EUROPEAN TECTONOSPHERE ACCORDING TO GEOLOGICAL AND GEOPHYSICAL DATA Abstract Only c46
V. B. Buryanov, V. V. Godiyenko, O. V. Zavgorodnyay, S. N. Kulik, and I. M. Logvinov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 60-61 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, No. 1, Jan. - Feb. 1984 p 39-48 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

A map of heat flow in Europe and diagrams showing the distribution of conducting objects in the Earth's crust and upper mantle and the gravitational effect of the European mantle were used with information from deep seismic sounding and the patterns of distribution of the velocities of seismic waves in the European mantle to construct geophysical models in accordance with the polymorphous-advection hypothesis of deep processes. It is shown that the last period in the geological history of Europe is characterized by activation of its southern and western parts, expressed in the formation of deep depressions, different types of fault-magmatic activation and epiplatform orongenesis. These processes are accompanied by anomalies of the heat flow, gravity and other fields of a mantle nature. There has been a substantial reduction in crustal thickness in the southern and western parts of Europe where a process is transpiring which, in the not distant geological past, ended in an oceanization process. Author

N84-27234# Joint Publications Research Service, Arlington, Va.
MODELING ANISOTROPIC PROPERTIES OF MEDIA WITH ORIENTED FRACTURES Abstract Only c46
T. T. Chergoleishvili, A. A. Balabuyev, and P. F. Mandzhgaladze *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 63 Transl. into ENGLISH from Soobshch. Akad. Nauk Gruzinskoy SSR (USSR), v. 112, no. 2, Nov. 1983 p 297-299 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Fracture formation at the focus of an impending earthquake occurs along a definite orientation governed by tectonic shears. The effectiveness of the many methods used in the theoretical computation of the elastic properties of such media was assessed in laboratory experiments using models with controllable parameters. The propagation velocity of longitudinal and transverse waves were investigated. Experimental results are compared with computations made by different methods. The curves corresponding to different theories quantitatively differ greatly from one another but there is a satisfactory correspondence of the shape of both the theoretical and experimental curves, revealing a uniformity of the dependence of wave propagation velocity on angle of approach to the oriented system of fractures. An attempt is made to resolve various discrepancies. Author

N84-27235# Joint Publications Research Service, Arlington, Va.
ALGORITHM FOR DETERMINING COORDINATES OF HYPOCENTERS OF NEAR EARTHQUAKES AND SEISMIC WAVE PROPAGATION VELOCITY IN LAYER Abstract Only c47
V. Yu. Burmin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 65-66 Transl. into ENGLISH from Vulkanol. i Seysmologiya (Moscow), no. 5, Sep. - Oct. 1983 p 81-90 (For primary document see N84-27177 17-42)

Avail: NTIS HC A05/MF A01

The algorithm which determine coordinates of earthquake hypocenters and a more precise determination of the velocity parameters of the medium are presented. A method to determine the coordinates of earthquake hypocenters when the velocity section of the medium is known is outlined. Simplifying assumptions are made: the Earth is flat, the observation system is situated in the plane XY and the velocity of propagation of seismic waves in the medium is a function only of depth. The conditions imposed on the observation system are examined. The problem of more precise determination of the velocity section is formulated and the conditions for existence and uniqueness of solution of this problem are defined. The following matters are dealt with: determination of travel time of seismic waves, increase in accuracy of determination of focal depths and epicenter coordinates, choice of coordinate system and allowance for Earth's sphericity, deterimation of magnitude, angles of emergence and azimuths and accuracy in determining hypocenter coordinates. E.A.K.

N84-27236# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF TROPOSPHERIC AEROSOL ON INTEGRAL ALBEDO OF CLOUDY ATMOSPHERE. UNDERLYING SURFACE SYSTEM Abstract Only **c34**
T. A. Tarasova and Ye. M. Feygelson *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 69-70 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1161-1166 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The integral albedo which is formed for the most part due to the albedo of clouds and the underlying surface, but aerosol outside the cloud can exert an influence is discussed. The four layer system was examined. Stimulated parameters for the individual layers and stipulated albedo of the underlying surface are used in computing the spectral albedo of the cloud layer of subsystem and transmission. The albedo for the system (a formula for Asys is derived) are determined. The method reduces the problem of determining the albedo of the four layer system to three independent problems, A sub 0, A sub I, A sub II, each of which is solved in the delta-Eddington two-flux approximation on the assumption of homogeneity of the individual layers. The effect of aerosol outside the cloud is indicated. In small absorption aerosol scattering in the layers outside the clouds increases the albedo of the system as a whole. The formula for Asys and other results evaluate the aerosol effect information of the integral albedo of the system. E.A.K.

N84-27237# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF VELOCITY SHEAR ON CHARACTER OF FLOW OF INCOMPRESSIBLE STRATIFIED FLUID AROUND OBSTACLE Abstract Only **c32**
I. G. Granberg *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 70 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1139-1150 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The flow of a fluid around an obstacle in the case of identical boundary conditions but with different velocity profiles of the oncoming flow was examined. It is assumed that flow velocity does not change sign and the conditions in the incident flow are stipulated. It is revealed that an increase in horizontal velocity shear and the introduction of vertical shear intensifies wave formation with some decrease in the amplitudes of the perturbations. The same occurs with disruption of the symmetry of flow. It indicated that the presence of vertical and horizontal improves conditions for the formation of leeward trapped waves. A possibility of the existence of several stationary regimes with one and the same form of the obstacle and the very same structure of the oncoming flow is shown. The vertical plane passing through the crest indicates the direction where the waves have the greatest amplitude. A jump or zone of static instability arises in this direction in currents with a vertical velocity shear. The introduction of a horizontal velocity shear eliminates the jump and exerts a smoothing effect on the waves, decreasing their amplitude. The least perturbed vertical section is the plane situated at a distance of 1/4 of the width of the obstacle from the axial plane. It is suggested that such a direction is favorable for the flights of aircraft when an isolated mountain or peak is rising above a range. E.A.K.

N84-27238# Joint Publications Research Service, Arlington, Va.
LIMITING RANGES IN ATMOSPHERIC RADIOACOUSTIC SOUNDING Abstract Only **c34**
M. A. Kallistratova and A. I. Kon *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 71 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1267-1271 Original language document was announced as A84-21046 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The effect of atmospheric turbulence on the operation of systems for radioacoustic sounding for large distances and the absence of wind are considered. It is shown that turbulence acts to limit the radius of operation of these systems. A formula is derived which gives the maximum range of operation as a function of the system's parameters. Satisfactory agreement with experimental data is obtained. It is noted that even by incorporating systems that compensate for wind drift, the maximum range cannot be significantly increased. E.A.K.

N84-27239# Joint Publications Research Service, Arlington, Va.
MOVEMENT MECHANISM OF SOLITARY SYNOPTIC EDDIES Abstract Only **c74**
V. A. Bogomolov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 71-72 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1252-1258 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The reasons for movement of a real thermohydrodynamic eddy was discussed. A model which does not take into account the effects of generation and dissipation of energy, thermal and topographic inhomogeneities of a current and the underlying surface is examined. This allows study of the two dimensional hydrodynamic mechanism controlling movement of a solitary eddy. Some qualitative aspects and tendencies in the interaction of regular and singular vorticity of two dimensional conservative current on a plane and on a sphere are examined. A kinematic interpretation of the results considering the direction of meridional movement of the eddy in the initial stage. A comparison of the model with observations indicates a definite influence of the quasi two dimensional dynamics of vorticity on the nature of movement of macroscale solitary eddies. E.A.K.

N84-27240# Joint Publications Research Service, Arlington, Va.
CONDENSATIONAL VARIABILITY OF SCATTERING PHASE FUNCTION Abstract Only **c46**
A. A. Isakov, M. A. Sviridenkov, and V. N. Sidorov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 72 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1321-1324 Original language document was announced as A84-21050 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The polarization nephelometer used in 1979 by Soviet and American investigators in a study of aerosols in the Georgian SSR was equipped with a heater which enabled the changing of the temperature of the air and the relative humidity. By changing the temperture, the way in which components of the scattering matrix depend on the relative humidity could be investigated, and information could be obtained on the light diffusion characteristics of the dry part of the aerosol. The dependence of the coefficient of directed light diffusion at a scattering angle of 45 deg on the relative humidity of the air is induced. It is found that the empirical expression is valid for almost the entire range of relative humidities. The results total scattering indicatrix are analyzed for scattering angles ranging from 15 deg to 165 deg. E.A.K.

N84-27241# Joint Publications Research Service, Arlington, Va.
PECULIARITIES IN DETERMINING SMALL CONTENTS OF ATMOSPHERIC MOISTURE BY SURFACE RADIO THERMAL SOUNDING METHODS Abstract Only **c46**
Sh. D. Kitay *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 73 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1318-1321 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The radiometric method for determining total moisture content Q in a vertical column of the atmosphere was developed. The method obtains data on Q in the middle latitude and tropical latitudes. A solution of this problem is remote sounding in the shorter wave range of radio waves. This is the physical basis for possible use of strong H2O submillimeter absorption lines in radio thermal sounding of the total moisture content under extremal atmospheric conditions. Total vertical absorption of radio waves in atmospheric water vapor in the neighborhood of five lines in the centimeter, millimeter and long wave parts of the submillimeter range were investigated. The analysis of absorption in the cloudless atmosphere in the resonance regions of water vapor allowed formulation of the conditions for optimum determination of moisture content in extremal situations. Regression relationships between the radio characteristics of the atmosphere in the neighborhood of the considered spectral lines and the total mass of water vapor in a column of the atmosphere and evaluations of the accuracy in determining total moisture content were obtained. E.A.K.

N84-27242# Joint Publications Research Service, Arlington, Va.
DRIFT MOVEMENT OF AEROSOL PARTICLES IN FIELD OF ATMOSPHERIC GRAVITY WAVES Abstract Only **c32**
S. Kh. Rozenfeld *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 74 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 33-39 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Internal gravity waves exert an influence on the energetics and dynamics of the upper layers of the atmosphere. Their influence on the motion of fine particles in the atmosphere is clarified. This is important in analyzing the reactions of particles of natural atmospheric aerosol to wave perturbations of the IGW type. The behavior of artificial clouds of tiny metallized bodies whose motion is tracked by radar is studied. The mechanism of drift motion of such particles was analyzed and it is found that there is an interrelationship between the size of particles in mean equilibrium and the wave parameters. It is found that there is a simple interrelationship between the elements of the wave pattern observed in clouds and the size of the particles making them up. It appears that in noctilucent clouds the drift mechanism adequately explains the holding of particles in a suspended state. E.A.K.

N84-27243# Joint Publications Research Service, Arlington, Va.
ASYMPTOTIC FORMULAS FOR DISTRIBUTION MOMENTS IN SOLUTION OF RADIATION TRANSFER EQUATION IN STOCHASTIC MEDIUM Abstract Only **c46**
G. A. Mikhaylov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 74-75 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 19-27 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

Asymptotic formulas which are derived for random intensity moments of radiation passing through a layer of matter of which the density as a random homogenous field are discussed Guasi Gaussain distribution of probabilities for optical thickness of the layer validation is presented. Moreover, the precise asymptotic form in the earlier study was obtained only for a special Markov model of a random density field with an exponential correlation function. This result was generalized for similar fields whose correlation functions are convex and a simplified model of the density field with independent values in stipulated layers of the thickness 2 rho, where rho is the correlation scale is presented. It is demonstrated that this model gives precise evaluations of the asymptotic form corresponding to more real fields and is convenient for evaluating the correlation function of random intensity. A heuristic analysis of the conditions under which these asymptotic formulas can be used in a three dimensional case is presented. A three dimensional case makes it possible to assign a clear physical sense to intensification of the transmission of radiation due to stochastic density inhomogeneity. E.A.K.

N84-27244# Joint Publications Research Service, Arlington, Va.
MAGNETIC EFFECT OF QUIET RING CURRENT Abstract Only **c46**
Ya. I. Feldshteyn and Ts. D. Prochkhidze *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 75-76 Transl. into ENGLISH from Soobshch. Akad. Nauk Gruzinskoy SSR (USSR), v. 112, no. 2, Nov. 1983 p 301-304 Original language document was announced as A84-28799 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

The magnetic effects of a quiet ring current at the geomagnetic equator near the solar activity minimum are discussed. The data for two different time intervals were reviewed. It is found that the magnetic effect of the quiet ring current for the two sets of data coincides within the limits of several nT, at the Earth's surface averaging -16.7 nT, and there is no increase in the intensity of the ring current directly before the development of geomagnetic disturbances. The value DR sub cn = -16.7 nT is the sum of the fields of two sources, the ring current field and the field of currents induced in the Earth. The relationship of the fields of the external and internal sources is dependent on the duration of the interval elapsing after the injection of particles within the radiaton belt. The close DR cn field values obtained by two methods indicate that DRq + DCFq - 0. During very quiet periods the boundary of the magnetosphere can withdraw to 12-13 RE. In this case DCFq approximately 11-14 nT and therfore DRq approximately -12 nT. E.A.K.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N84-27245 Missouri Univ., Columbia.
CONTEXTUAL CLASSIFICATION OF REMOTELY SENSED DATA Ph.D. Thesis
Sadwaluck Honboonherm 1983 168 p
Avail: Univ. Microfilms Order No. DA8406203

Contextual information currently is utilized to modify pixel classification data derived from digital remotely sensed data. A contextual procedure was applied to classified digital imagery to improve the contextual integrity and the utility of the classification. Classification results achieved in a LANDSAT satellite analysis of north central Missouri were used. The probabilities of pixel classification were iteratively updated as a function of the set of probabilities found in the local area. In updating the probabilities, two factors were considered: (1) the initial probabilities, and (2) the compatibility coefficients. A method for generating the compatibility coefficients for a relaxation labeling process was developed. Techniques for generating the contextual influerfce for the updating algorithm employed in the relaxation labeling process and the stopping criteria were proposed. The reclassification method proved to be effective in improving the contextual integrity and the accuracies of individual classes. The experimental convergence algorithm was effective in reducing processing time. Dissert. Abstr.

N84-27246 Iowa State Univ. of Science and Technology, Ames.
USE OF TRANSFORMED LANDSAT DATA IN REGRESSION ESTIMATION OF CROP ACREAGES Ph.D. Thesis
Hsien-Ming Hung 1983 174 p
Avail: Univ. Microfilms Order No. DA8407079

The use of functions of a vector X as auxiliary variables in

the regression estimation of the population mean with survey data are investigated. Functions of the vector X are estimated by estimating the unknown parameters of the transformation. Under certain assumptions, the error in the estimated parameters is order n(supra-1/2), where n is the sample size. The effect of estimating the auxiliary variables is investigated under the assumption that the finite population is a random sample of an infinite population. Asymptotic properties of regression estimators of the finite population mean constructed with estimated auxiliary variables are developed. The U.S. Department of Agriculture (USDA) uses satellite (LANDSAT) data to improve crop acreage estimates. LANDSAT data consist of a vector X of four radiation values in four wavelength bands of the electromagnetic spectrum. Based on these data, the USDA has developed a classification function for use as an auxillary variable. Dissert. Abstr.

N84-27247*# EROS Data Center, Sioux Falls, S. Dak.
LANDSAT 4 INVESTIGATIONS OF THEMATIC MAPPER AND MULTISPECTRAL SCANNER APPLICATIONS Quarterly Report
Donald T. Lauer, Principal Investigator 3 Jul. 1984 3 p
(NASA Order S-10757-C)
(E84-10152; NASA-CR-173223; NAS 1.26:173223) Avail: NTIS HC A02/MF A01 CSCL 08B

Interband detector noise was suppressed in the TIPS TM North Dakota data by median filtering. Procedures were developed to optimize the visual information content of thematic mapper data and evaluate the resulting photographic products by visual interpretation. A digital to analog TM transfer function was developed which properly placed the digital values on the most useable portion of film response curve. Utilizing the calculated minimum, mean, and maximum and the respective standard deviations of the bands from 50 sample scenes of TM data, look up tables were designed which resulted in acceptable photographic products. These products were evaluated by generation of color composites of selected band combinations using standard photo production procedures, and visual interpretation of scene features. A.R.H.

N84-27248*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HEAT CAPACITY MAPPING RADIOMETER (HCMR) DATA PROCESSING ALGORITHM, CALIBRATION, AND FLIGHT PERFORMANCE EVALUATION
J. R. Bohse (Computer Sciences Corp.), M. Bewtra (Computer Sciences Corp.), and W. L. Barnes Apr. 1979 173 p refs HCMM
(E84-10153; NASA-TM-80258; NAS 1.15:80258) Avail: NTIS HC A08/MF A01 CSCL 14B

The rationale and procedures used in the radiometric calibration and correction of Heat Capacity Mapping Mission (HCMM) data are presented. Instrument-level testing and calibration of the Heat Capacity Mapping Radiometer (HCMR) were performed by the sensor contractor ITT Aerospace/Optical Division. The principal results are included. From the instrumental characteristics and calibration data obtained during ITT acceptance tests, an algorithm for post-launch processing was developed. Integrated spacecraft-level sensor calibration was performed at Goddard Space Flight Center (GSFC) approximately two months before launch. This calibration provided an opportunity to validate the data calibration algorithm. Instrumental parameters and results of the validation are presented and the performances of the instrument and the data system after launch are examined with respect to the radiometric results. Anomalies and their consequences are discussed. Flight data indicates a loss in sensor sensitivity with time. The loss was shown to be recoverable by an outgassing procedure performed approximately 65 days after the infrared channel was turned on. It is planned to repeat this procedure periodically. M.G.

N84-27249*# Canada Centre for Remote Sensing, Ottawa (Ontario).
EVALUATING LANDSAT-4 MSS AND TM DATA Progress Report, 3 Jan. - 2 May 1984
W. M. Strome, J. Cihlar, D. G. Goodenough, F. E. Guertin, Principal Investigator, J. M. Murphy, G. Grieve, R. Simard, D. Horler, and F. J. Ahern 12 Jun. 1984 9 p refs Sponsored by NASA ERTS (E84-10157; NASA-CR-173669; NAS 1.26:173669; PR-3) Avail: NTIS HC A02/MF A01 CSCL 05B

Interband line pixel misregistrations were determined for the four MSS bands of the Mistassini, Ontario scene and multitemporal registration of LANDSAT-4 products were tested for two different geocoded scenes. Line and pixel misregistrations are tabulated as determined by the manual ground control points and the digital band to band correlation techniques. A method was developed for determining the spectral information content of TM images for forestry applications. A.R.H.

N84-27250*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
LANDSAT-4 IMAGE DATA QUALITY ANALYSIS Quarterly Progress Report, 10 Feb. - 9 May 1984
P. E. Anuta 9 May 1984 3 p ERTS
(Contract NAS5-26859)
(E84-10158; NASA-CR-173670; NAS 1.26:173670;
LARS-CR-050984) Avail: NTIS HC A02/MF A01 CSCL 05B

Methods were developed for estimating point spread functions from image data. Roads and bridges in dark backgrounds are being examined as well as other smoothing methods for reducing noise in the estimated point spread function. Tomographic techniques were used to estimate two dimensional point spread functions. Reformatting software changes were implemented to handle formats for LANDSAT-5 data. A.R.H.

N84-27251*# Delaware Univ., Newark. Coll. of Marine Studies.
EVALUATION OF SPATIAL, RADIOMETRIC AND SPECTRAL THEMATIC MAPPER PERFORMANCE FOR COASTAL STUDIES Quarterly Status Technical Progress Report, 1 Apr. - 30 Jun. 1984
V. Klemas, Principal Investigator 30 Jun. 1984 5 p ERTS
(Contract NAS5-27580)
(E84-10159; NASA-CR-173671; NAS 1.26:173671) Avail: NTIS HC A02/MF A01 CSCL 08B

The effect different wetland plant canopies have upon observed reflectance in Thematic Mapper bands is studied. The three major vegetation canopy types (broadleaf, gramineous and leafless) produce unique spectral responses for a similar quantity of live biomass. The spectral biomass estimate of a broadleaf canopy is most similar to the harvest biomass estimate when a broadleaf canopy radiance model is used. All major wetland vegetation species can be identified through TM imagery. Simple regression models are developed equating the vegetation index and the infrared index with biomass. The spectral radiance index largely agreed with harvest biomass estimates. M.A.C.

N84-27252*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
METEOROLOGICAL MODELS FOR ESTIMATING PHENOLOGY OF CORN
C. S. T. Daughtry, J. C. Cochran, and S. E. Hollinger Feb. 1984 21 p refs ERTS
(Contract NAS9-16528)
(E84-10160; NASA-CR-171790; NAS 1.26:171790;
LARS-TR-021584) Avail: NTIS HC A02/MF A01 CSCL 02C

Knowledge of when critical crop stages occur and how the environment affects them should provide useful information for crop management decisions and crop production models. Two sources of data were evaluated for predicting dates of silking and physiological maturity of corn (Zea mays L.). Initial evaluations were conducted using data of an adapted corn hybrid grown on a Typic Agriaquoll at the Purdue University Agronomy Farm. The second phase extended the analyses to large areas using data acquired by the Statistical Reporting Service of USDA for crop reporting districts (CRD) in Indiana and Iowa. Several thermal models were compared to calendar days for predicting dates of silking and physiological maturity. Mixed models which used a

combination of thermal units to predict silking and days after silking to predict physiological maturity were also evaluated. At the Agronomy Farm the models were calibrated and tested on the same data. The thermal models were significantly less biased and more accurate than calendar days for predicting dates of silking. Differences among the thermal models were small. Significant improvements in both bias and accuracy were observed when the mixed models were used to predict dates of physiological maturity. The results indicate that statistical data for CRD can be used to evaluate models developed at agricultural experiment stations. M.G.

N84-27253*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

AGGREGATING AVAILABLE SOIL WATER HOLDING CAPACITY DATA FOR CROP YIELD MODELS

C. E. Seubert, C. S. T. Daughtry, D. A. Holt, and M. F. Baumgardner Jan. 1984 18 p refs ERTS

(Contract NAS9-16528)

(E84-10161; NASA-CR-171791; NAS 1.26:171791; LARS-TR-011584) Avail: NTIS HC A02/MF A01 CSCL 02C

The total amount of water available to plants that is held against gravity in a soil is usually estimated as the amount present at -0.03 MPa average water potential minus the amount present at -1.5 MPa water potential. This value, designated available water-holding capacity (AWHC), is a very important soil characteristic that is strongly and positively correlated to the inherent productivity of soils. In various applications, including assessing soil moisture status over large areas, it is necessary to group soil types or series as to their productivity. Current methods to classify AWHC of soils consider only total capacity of soil profiles and thus may group together soils which differ greatly in AWHC as a function of depth in the profile. A general approach for evaluating quantitatively the multidimensional nature of AWHC in soils is described. Data for 902 soil profiles, representing 184 soil series, in Indiana were obtained from the Soil Characterization Laboratory at Purdue University. The AWHC for each of ten 150-mm layers in each soil was established, based on soil texture and parent material. A multivariate clustering procedure was used to classify each soil profile into one of 4, 8, or 12 classes based upon ten-dimensional AWHC values. The optimum number of classes depends on the range of AWHC in the population of oil profiles analyzed and on the sensitivity of a crop to differences in distribution of water within the soil profile. M.G.

N84-27254*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

COSTS OF MEASURING LEAF AREA INDEX OF CORN

C. S. T. Daughtry and S. E. Hollinger Mar. 1984 18 p refs ERTS

(Contract NAS9-16528)

(E84-10162; NASA-CR-171792; NAS 1.26:171792; LARS-TR-030784) Avail: NTIS HC A02/MF A01 CSCL 02C

The magnitude of plant-to-plant variability of leaf area of corn plants selected from uniform plots was examined and four representative methods for measuring leaf area index (LAI) were evaluated. The number of plants required and the relative costs for each sampling method were calculated to detect 10, 20, and 50% differences in LAI using 0.05 and 0.01 tests of significance and a 90% probability of success (beta = 0.1). The natural variability of leaf area per corn plant was nearly 10%. Additional variability or experimental error may be introduced by the measurement technique employed and by nonuniformity within the plot. Direct measurement of leaf area with an electronic area meter had the lowest CV, required that the fewest plants be sampled, but required approximately the same amount of time as the leaf area/weight ratio method to detect comparable differences. Indirect methods based on measurements of length and width of leaves required more plants but less total time than the direct method. Unless the coefficients for converting length and width to area are verified frequently, the indirect methods may be biased. When true differences in LAI among treatments exceed 50% of mean, all four methods are equal. The method of choice depends on the resources available, the differences to be detected, and what additional information, such as leaf weight or stalk weight, is also desired. M.G.

N84-27255*# Texas A&M Univ., College Station. Remote Sensing Center.

CROP MOISTURE ESTIMATION OVER THE SOUTHERN GREAT PLAINS WITH DUAL POLARIZATION 1.66 CENTIMETER PASSIVE MICROWAVE DATA FROM NIMBUS 7 Final Report

Marshall J. McFarland, Paul H. Harder, II, Gregory D. Wilke, and George L. Huebner, Jr. May 1984 154 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(Contract NAS9-16822)

(E84-10163; NASA-CR-171794; NAS 1.26:171794; RSC-4854) Avail: NTIS HC A08/MF A01 CSCL 02C

Moisture content of snow-free, unfrozen soil is inferred using passive microwave brightness temperatures from the scanning multichannel microwave radiometer (SMMR) on Nimbus-7. Investigation is restricted to the two polarizations of the 1.66 cm wavelength sensor. Passive microwave estimates of soil moisture are of two basic categories; those based upon soil emissivity and those based upon the polarization of soil emission. The two methods are compared and contrasted through the investigation of 54 potential functions of polarized brightness temperatures and, in some cases, ground-based temperature measurements. Of these indices, three are selected for the estimated emissivity, the difference between polarized brightness temperatures, and the normalized polarization difference. Each of these indices is about equally effective for monitoring soil moisture. Using an antecedent precipitation index (API) as ground control data, temporal and spatial analyses show that emissivity data consistently give slightly better soil moisture estimates than depolarization data. The difference, however, is not statistically significant. It is concluded that polarization data alone can provide estimates of soil moisture in areas where the emissivity cannot be inferred due to nonavailability of surface temperature data. Author

N84-27256*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

IDENTIFICATION AND ESTIMATION OF THE AREA PLANTED WITH IRRIGATED RICE BASED ON THE VISUAL INTERPRETATION OF LANDSAT MSS DATA [IDENTIFICACAO E AVALIACAO DA AREA OCUPADA COM ARROZ IRRIGADO ATRAVES DA INTERPRETACAO VISUAL DE DADOS DO MSS DO LANDSAT]

Nelson de Jesus Parada, Principal Investigator, Mauricio A. Moreira (Tecnicos do IRGA), Getulio V. Assuncao, Rene Antonio Novaes, Arturo A. B. Mendoza (Tecnicos do IRGA), Clovis A. Bauer, Ivo Tavares Ritter (Tecnicos do IRGA), Jaceguay A. I. Barros, Jorge Everardo Perez (Tecnicos do IRGA), Jose L. O. Thedy (Tecnicos do IRGA) et al Dec. 1983 80 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E84-10164; NASA-CR-173640; NAS 1.26:173640; INPE-2991-NTE/212) Avail: NTIS HC A05/MF A01 CSCL 02C

The objective was to test the feasibility of the application of MSS-LANDSAT data to irrigated rice crop identification and area evaluation, within four rice growing regions of the Rio Grande do Sul state, in order to extend the methodology for the whole state. The applied methodology was visual interpretation of the following LANDSAT products: channels 5 and 7 black and white imageries and color infrared composite imageries all at the scale of 1:250.000. For crop identification and evaluation, the multispectral criterion and the seasonal variation were utilized. Based on the results it was possible to conclude that: (1) the satellite data were efficient for crop area identification and evaluation; (2) the utilization of the multispectral criterion, allied to the seasonal variation of the rice crop areas from the other crops and, (3) the large cloud cover percentage found in the satellite data made it impossible to realize a rice crop spectral monitoring and, therefore, to define the best dates for such data acquisition for rice crop assessment. Author

N84-27257*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A SAMPLING SYSTEM FOR ESTIMATING THE CULTIVATION OF WHEAT (TRITICUM AESTIVUM L) FROM LANDSAT DATA M.S. Thesis - 21 Jul. 1983 [SISTEMA DE AMOSTRAGEM PARA ESTIMAR A AREA DA CULTURA DO TRIGO (TRITICUM AESTIVUM L) ATRAVES DE DADOS DO LANDSAT]
Nelson de Jesus Parada, Principal Investigator and Mauricio Alves Moreira Oct. 1983 109 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS
(E84-10165; NASA-CR-173638; NAS 1.26:173638; INPE-2941-TDL/150) Avail: NTIS HC A06/MF A01 CSCL 02C

Using digitally processed MSS/LANDSAT data as auxiliary variable, a methodology to estimate wheat (Triticum aestivum L) area by means of sampling techniques was developed. To perform this research, aerial photographs covering 720 sq km in Cruz Alta test site at the NW of Rio Grande do Sul State, were visually analyzed. LANDSAT digital data were analyzed using non-supervised and supervised classification algorithms; as post-processing the classification was submitted to spatial filtering. To estimate wheat area, the regression estimation method was applied and different sample sizes and various sampling units (10, 20, 30, 40 and 60 sq km) were tested. Based on the four decision criteria established for this research, it was concluded that: (1) as the size of sampling units decreased the percentage of sampled area required to obtain similar estimation performance also decreased; (2) the lowest percentage of the area sampled for wheat estimation with relatively high precision and accuracy through regression estimation was 90% using 10 sq km s the sampling unit; and (3) wheat area estimation by direct expansion (using only aerial photographs) was less precise and accurate when compared to those obtained by means of regression estimation.
Author

N84-27258*# Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.
DEVELOPMENT OF GREAT LAKES ALGORITHMS FOR THE NIMBUS-G COASTAL ZONE COLOR SCANNER Final Report
Fred J. Tanis and David R. Lyzenga Jun. 1981 95 p refs
(Contract NAS3-22442)
(NASA-CR-173511; NAS 1.26:173511; ERIM-150000-11-F) Avail: NTIS HC A05/MF A01 CSCL 05B

A series of experiments in the Great Lakes designed to evaluate the application of the Nimbus G satellite Coastal Zone Color Scanner (CZCS) were conducted. Absorption and scattering measurement data were reduced to obtain a preliminary optical model for the Great Lakes. Available optical models were used in turn to calculate subsurface reflectances for expected concentrations of chlorophyll-a pigment and suspended minerals. Multiple nonlinear regression techniques were used to derive CZCS water quality prediction equations from Great Lakes simulation data. An existing atmospheric model was combined with a water model to provide the necessary simulation data for evaluation of the preliminary CZCS algorithms. A CZCS scanner model was developed which accounts for image distorting scanner and satellite motions. This model was used in turn to generate mapping polynomials that define the transformation from the original image to one configured in a polyconic projection. Four computer programs (FORTRAN IV) for image transformation are presented.
R.S.F.

N84-27259# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PROJECT SERGE: BRAZIL REFERENTIAL FIELD DATA FOR THE SIR-A EXPERIMENT [PROJETO SERGE: DADOS DE CAMPO REFERENTES AO EXPERIMENTO SIR-A NO BRASIL]
Milton Garcia Balieiro, Paulo Roberto Martini, and Joao Roberto dosSantos Nov. 1983 108 p refs In PORTUGUESE; ENGLISH summary
(INPE-2973-NTE/210) Avail: NTIS HC A02/MF A01

The ground observations undertaken over the Southern of Espirito Santo State and the Southeastern of Minas Gerais State, along the SPACE SHUTTLE 2 flying orbit are investigated. Field data relates mostly with lithology, geological structures and forest cover. Specific geomorphological and pedological aspects are collected. Ground data are being applied to evaluate the SIR-A Experiment, developed in the Space Shuttle-2 mission, for natural resources mapping and prospecting.
M.A.C.

N84-27260# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A REPORT OF CEARA PROJECT ACTIVITIES [RELATORIO DE ATIVIDADES DO PROJETO CEARA]
Marx Prestes Barbosa and Rene Antonio Novaes Dec. 1983 62 p In PORTUGUESE; ENGLISH summary
(INPE-2988-RPE/452) Avail: NTIS HC A04/MF A01

The application of remote sensing techniques and are transfer of the methodologies of applications of remote sensing data are presented. Natural resources, particularly the water resources are studied. The prolonged drought in the north eastern region of Brazil, and the obtained results from the first stage of this project are outlined.
E.A.K.

N84-27261# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RESEARCH AND APPLICATIONS OF DATA FROM ENVIRONMENTAL SATELLITES: DETERMINING PARAMETERS AND DEVELOPING INTERPRETATION TECHNIQUES FOR APPLICATIONS OF ENVIRONMENTAL SATELLITE DATA [PESQUISAS E APLICACOES EM DADOS DE SATELITES AMBIENTAIS DETERMINACAO DE PARAMETROS E DESENVOLVIMENTO DE TECNICAS INTERPRETATIVAS PARA APLICACOES DE DADOS DE SATELITES AMBIENTAIS]
Getulio Teixeira Batista, Fausto Carlos deAlmeida, Antonio Tebaldi Tardin, and Sergio dos Anjos F. Pinto Feb. 1984 21 p refs In PORTUGUESE; ENGLISH summary
(INPE-3005-NTE/213) Avail: NTIS HC A02/MF A01

The determination of parameters and development of techniques of interpretation of data collected by environmental satellites (Land and Meteorological Resources) emphasizing the activities carried out in the first semester of 1983 is described. This technology is highly important for the country, especially in the areas of crop production forecast, precipitaton estimation, mineral and forest resources, land use and hydrographic basin management.
Author

N84-27262*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FRONTIERS OF REMOTE SENSING OF THE OCEANS AND TROPOSPHERE FROM AIR AND SPACE PLATFORMS
Washington May 1984 615 p refs Symp. held in Shoresh, Israel, 14-23 May 1984; sponsored in cooperation with the Israel Academy of Sciences and Humanities
(NASA-CP-2303; NAS 1.55:2303) Avail: NTIS HC A99/MF A01 CSCL 08C

Several areas of remote sensing are addressed including: future satellite systems; air-sea interaction/wind; ocean waves and spectra/S.A.R.; atmospheric measurements (particulates and water vapor); synoptic and weather forecasting; topography; bathymetry; sea ice; and impact of remote sensing on synoptic analysis/forecasting. For individual titles, see N84-27263 through N84-27318.

N84-27263*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
REMOTE SENSING FOR OCEANOGRAPHY: PAST, PRESENT, FUTURE c48
Lawrence F. McGoldrick *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 1-10 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

Oceanic dynamics was traditionally investigated by sampling from instruments in situ, yielding quantitative measurements that are intermittent in both space and time; the ocean is undersampled. The need to obtain proper sampling of the averaged quantities

treated in analytical and numerical models is at present the most significant limitation on advances in physical oceanography. Within the past decade, many electromagnetic techniques for the study of the Earth and planets were applied to the study of the ocean. Now satellites promise nearly total coverage of the world's oceans using only a few days to a few weeks of observations. Both a review of the early and present techniques applied to satellite oceanography and a description of some future systems to be launched into orbit during the remainder of this century are presented. Both scientific and technologic capabilities are discussed. Author

N84-27264*# European Space Technology Center, Noordwijk (Netherlands).
ESA ACTIVITIES IN THE USE OF MICROWAVES FOR THE REMOTE SENSING OF THE EARTH
Douglas Maccoll *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 11-17 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08G

The program of activities under way in the European Space Agency (ESA) directed towards Remote Sensing of the oceans and troposphere is discussed. The initial project is the launch of a satellite named ERS-1 with a primary payload of microwave values in these C- and Ku-bands. This payload is discussed in depth. The secondary payload includes precision location experiments and an instrument to measure sea surface temperature, which are described. The important topic of calibration is extensively discussed, and a review of activities directed towards improvements to the instruments for future satellites is presented. Some discussion of the impact of the instrument payload on the spacecraft design follows and the commitment of ESA to the provision of a service of value to the ultimate user is emphasized. Author

N84-27265*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
SPECTRASAT: A CONCEPT FOR THE COLLECTION OF GLOBAL DIRECTIONAL WAVE SPECTRA c32
Robert C. Beal *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 19-28 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 20N

The synthetic aperture radar (SAR) imagery from SEASAT revealed a rich tapestry of backscatter patterns from the surface of the ocean. Although still far from being fully understood, these patterns occurred on nearly all spatial scales accessible to the SAR, that is from its spatial resolution of 25 m to its full swath width of 100 km. Futhermore, the backscatter signature appear to reveal a large variety of atmospheric and oceanic processes that occur above, at, and below the ocean surface. Proper interpretation of these signatures of varying scales with respect to their underlying geophysical causes is a major objective of SAR ocean research. Even now, however, it is clear that SAR offers a unique means to monitor wind and waves over global scales. A properly designed, configured, and complimented orbiting SAR system should yield substantial improvements in operational forecasts vital to marine activities. Since wind and wave information is optimally extracted in the spectral domain, the name SPECTRASAT is proposed for this global collection scheme. Author

N84-27266*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH RESOLUTION OBSERVATIONS OF LOW CONTRAST PHENOMENA FROM AN ADVANCED GEOSYNCHRONOUS PLATFORM (AGP)
Marvin S. Maxwell *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 29-40 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 05B

Present technology allows radiometric monitoring of the Earth, ocean and atmosphere from a geosynchronous platform with good spatial, spectral and temporal resolution. The proposed system could provide a capability for multispectral remote sensing with a 50 m nadir spatial resolution in the visible bands, 250 m in the 4 micron band and 1 km in the 11 micron thermal infrared band. The diffraction limited telescope has a 1 m aperture, a 10 m focal length (with a shorter focal length in the infrared) and linear and area arrays of detectors. The diffraction limited resolution applies to scenes of any brightness but for a dark low contrast scenes, the good signal to noise ratio of the system contribute to the observation capability. The capabilities of the AGP system are assessed for quantitative observations of ocean scenes. Instrument and ground system configuration are presented and projected sensor capabilities are analyzed. Author

N84-27267*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
REMOTE SENSING OF AIR-SEA INTERACTIONS
David Atlas and Erik Mollo-Christensen *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 41-49 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04A

A number of preliminary concepts for the measurement or inference of fluxes across the air-sea interface through remote sensing are proposed. All the methods are achievable from aircraft with state-of-the-art technology. Only one is now ready for space implementation. The focus is on cold outbreaks. Sensible (latent) heat flux is inferred from the difference between initial surface air temperature (vapor mixing ratio) and the downwind SST (and corresponding saturation mixing ratio). The downwind growth rate of the PBL as measured by lidar also provides estimates of surface heating and the cross-inversion entrainment velocity. The lidar also provides a measure of the depth of the inversion and its penetration by surface-forced convection; this permits estimates of the surface heat flux. Lidar and radiometric measurements of cloud top height and temperature provide means of deducing the temperature sounding downstream so that heating is computed with the aid of a known sounding upstream. Author

N84-27268*# Washington Univ., Seattle. Dept. of Atmospheric Sciences.
SCATTEROMETER CAPABILITIES IN REMOTELY SENSING GEOPHYSICAL PARAMETERS OVER THE OCEAN: THE STATUS AND THE POSSIBILITIES
Robert A. Brown *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 51-56 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

Extensive comparison between surface measurements and satellite Scatt signal and predicted winds show successful wind and weather analysis comparable with conventional weather service analyses. However, in regions often of the most interest, e.g., fronts and local storms, inadequacies in the latter fields leaves an inability to establish the satellite sensor capabilities. Thus, comparisons must be made between wind detecting measurements and other satellite measurements of clouds, moisture, waves or any other parameter which responds to sharp gradients in the wind. At least for the windfields and the derived surface pressure field analysis, occasional surface measurements are required to anchor and monitor the satellite analyses. Their averaging times must be made compatible with the satellite sensor measurement. Careful attention must be paid to the complex fields which contain many scales of turbulence and coherent structures affecting the averaging process. The satellite microwave system is capable of replacing the conventional point observation/numerical analysis for the ocean weather. B.G.

N84-27269*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A NEW PARAMETERIZATION OF AN EMPIRICAL MODEL FOR

WIND/OCEAN SCATTEROMETRY
Peter M. Woiceshyn, Morton G. Wurtele (California Univ., Los Angeles), Dale H. Boggs (DB Systems Ltd., La Canada, Calif.), Lawrence F. McGoldrick (APL, Laurel, Md.), and Steven Peteherych (Atmospheric Environment Service, Downsview, Ontario) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 57-74 refs (For primary document see N84-27262 17-43) (Contract NAS7-918)
Avail: NTIS HC A99/MF A01 CSCL 04A

The power law form of the SEASAT A Scatterometer System (SASS) empirical backscatter-to-wind model function does not uniformly meet the instrument performance over the range 4 to 24 /ms. Analysis indicates that the horizontal polarization (H-Pol) and vertical polarization (V-Pol) components of the benchmark SASS1 model function yield self-consistent results only for a small mid-range of speeds at larger incidence angles, and for a somewhat larger range of speeds at smaller incidence angles. Comparison of SASS1 to in situ data over the Gulf of Alaska region further underscores the shortcomings of the power law form. Finally, a physically based empirical SASS model is proposed which corrects some of the deficiencies of power law models like SASS1. The new model allows the mutual determination of sea surface wind stress and wind speed in a consistent manner from SASS backscatter measurements. B.G.

N84-27270*# Canada Centre for Inland Waters, Burlington (Ontario).
DOES THE SCATTEROMETER SEE WIND SPEED OR FRICTION VELOCITY? c32
Mark A. Donelan and Willard J. Pierson, Jr. (City Coll. of the City Univ. of New York) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 75-87 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 20N

Studies of radar backscatter from the sea surface are referred either to the wind speed, U, or friction velocity, u(sub *). Bragg scattering theory suggests that these variations in backscatter are directly related to the height of the capillary-gravity waves modulated by the larger waves in tilt and by straining of the short wave field. The question then arises as to what characteristic of the wind field is most probably correlated with the wave number spectrum of the capillary-gravity waves. The justification for selecting U as the appropriate meteorological parameter to be associated with backscatter from L-band to Ku-band are reviewed. Both theoretical reasons and experimental evidence are used to demonstrate that the dominant parameter is U/C(lambda) where U is the wind speed at a height of about lambda/2 for waves having a phase speed of C(lambda). Author

N84-27271*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
SCANNING WIND-VECTOR SCATTEROMETERS WITH TWO PENCIL BEAMS c35
T. Kirimoto and R. K. Moore *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 89-104 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 14B

A scanning pencil-beam scatterometer for ocean windvector determination has potential advantages over the fan-beam systems used and proposed heretofore. The pencil beam permits use of lower transmitter power, and at the same time allows concurrent use of the reflector by a radiometer to correct for atmospheric attenuation and other radiometers for other purposes. The use of dual beams based on the same scanning reflector permits four looks at each cell on the surface, thereby improving accuracy and allowing alias removal. Simulation results for a spaceborne dual-beam scanning scatterometer with a 1-watt radiated power at an orbital altitude of 900 km is described. Two novel algorithms for removing the aliases in the windvector are described, in addition to an adaptation of the conventional maximum likelihood algorithm. The new algorithms are more effective at alias removal than the conventional one. Measurement errors for the wind speed, assuming perfect alias removal, were found to be less than 10%. Author

N84-27272*# Remote Sensing Systems, Sausalito, Calif.
NEW ALGORITHMS FOR MICROWAVE MEASUREMENTS OF OCEAN WINDS c32
Frank J. Wentz and Steve Peteherych (Atmospheric Environment Service, Downsview, Ontario) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 105-114 refs (For primary document see N84-27262 17-43)
(Contracts NASw-3606; N00014-83-C-0520)
Avail: NTIS HC A99/MF A01 CSCL 20N

Improved second generation wind algorithms are used to process the three month SEASAT SMMR and SASS data sets. The new algorithms are derived without using in situ anemometer measurements. All known biases in the sensors prime measurements are removed, and the algorithms prime model functions are internally self-consistent. The computed SMMR and SASS winds are collocated and compared on a 150 km cell-by-cell basis, giving a total of 115444 wind comparisons. The comparisons are done using three different sets of SMMR channels. When the 6.6H SMMR channel is used for wind retrieval, the SMMR and SASS winds agree to within 1.3 m/s over the SASS primary swath. At nadir where the radar cross section is less sensitive to wind, the agreement degrades to 1.9 m/s. The agreement is very good for winds from 0 to 15 m/s. Above 15 m/s, the off-nadir SASS winds are consistently lower than the SMMR winds, while at nadir the high SASS winds are greater than SMMR's. When 10.7H is used for the SMMR wind channel, the SMMR/SASS wind comparisons are not quite as good. When the frequency of the wind channel is increased to 18 GHz, the SMMR/SASS agreement substantially degrades to about 5 m/s. Author

N84-27273*# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Space Programme Dept.
OCEAN WIND FIELD MEASUREMENT PERFORMANCE OF THE ERS-1 SCATTEROMETER c47
Peter Hans and H. Schuessler *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 115-122 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

The Active Microwave Instrumentation (AMI), which will be implemented on the ERS-1, is a 5.3 GHz multipurpose radar for land surface imaging, ocean wave spectrum measurement and wind observations over oceans. The imaging and wave measurements apply Synthetic Aperture Radar (SAR) techniques, while wind field detection is performed by the Scatterometer as part of the AMI. The Scatterometer system design was developed and optimized with the aid of a performance simulator. This paper, aimed at giving an overview, is presented about the: (1) ERS-1 Scatterometer system design; (2) Error budget; and the (3) Overall calibration concept. M.A.C.

N84-27274*# Canada Centre for Remote Sensing, Ottawa (Ontario).
THEORY AND MEASURE OF CERTAIN IMAGE NORMS IN SAR c32
R. Keith Raney *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 123-136 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

The principal properties of synthetic aperture radar SAR imagery of point and distributed objects are summarized. Against this background, the response of a SAR (Synthetic Aperture Radar) to the moving surface of the sea is considered. Certain conclusions are drawn as to the mechanism of interaction between microwaves and the sea surface. Focus and speckle spectral tests may be used on selected SAR imagery for areas of the ocean. The fine

structure of the sea imagery is sensitive to processor focus and adjustment. The ocean reflectivity mechanism must include point like scatterers of sufficient radar cross section to dominate the return from certain individual resolution elements. Both specular and diffuse scattering mechanisms are observed together, to varying degree. The effect is sea state dependent. Several experiments are proposed based on imaging theory that could assist in the investigation of reflectivity mechanisms. M.A.C.

N84-27275*# Stanford Univ., Calif. Center for Radar Astronomy.

SYNTHETIC APERTURE RADAR IMAGES OF OCEAN WAVES, THEORIES OF IMAGING PHYSICS AND EXPERIMENTAL TESTS c32

John F. Vesecky, Stephen L. Durden, Martha P. Smith, and David A. Napolitano *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 137-148 refs Sponsored by NASA and ONR (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

The physical mechanism for the synthetic Aperture Radar (SAR) imaging of ocean waves is investigated through the use of analytical models. The models are tested by comparison with data sets from the SEASAT mission and airborne SAR's. Dominant ocean wavelengths from SAR estimates are biased towards longer wavelengths. The quasispecular scattering mechanism agrees with experimental data. The Doppler shift for ship wakes is that of the mean sea surface. M.A.C.

N84-27276*# Nebraska Univ., Lincoln. Dept. of Electrical Engineering.

OPTIMUM BACKSCATTER CROSS SECTION OF THE OCEAN AS MEASURED BY SYNTHETIC APERTURE RADARS c32

Ezekiel Bahar, Clifford L. Rufenach (NOAA, Boulder, Colo.), Donald Barrick (NOAA, Boulder, Colo.), and Mary Ann Fitzwater *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 149-158 refs Submitted for publication (For primary document see N84-27262 17-43)
(Contract DAAG29-83-K-0123)
Avail: NTIS HC A99/MF A01 CSCL 17I

The interaction of the radar signals from Synthetic Aperture Radar (SAR) and Side Looking Airborne Radar (SLAR) is particularly important for the ocean surface where the radar modulation can yield information about the long ocean wave field. Radar modulation measurements from fixed platforms are made in wavetanks and the open oceans. The surfaces are described in terms of two scale models. The radar modulation is considered to be principally due to: (1) geometrical tilt due to the slope of the long ocean waves, and (2) the straining of the short waves (by hydrodynamic interaction). For application to moving platforms, this modulation needs to be described in terms of a general geometry for both like and cross polarization since the long ocean waves, in general, travel in arbitrary directions. The finite resolution of the radar is considered for tilt modulation with hydrodynamic effects neglected. M.A.C.

N84-27277*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

TRACKING OCEAN WAVE SPECTRUM FROM SAR IMAGES c32

Andrew D. Goldfinger, Robert C. Beal, Francis M. Monaldo, and D. G. Tilley *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 159-168 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

An end to end algorithm for recovery of ocean wave spectral peaks from Synthetic Aperture Radar (SAR) images is described. Current approaches allow precisions of 1 percent in wave number, and 0.6 deg in direction. M.A.C.

N84-27278*# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

SAR IMAGERY OF OCEAN-WAVE SWELL TRAVELING IN AN ARBITRARY DIRECTION c32

Clifford L. Rufenach, Robert A. Shuchman (ERIM, Ann Arbor), and David R. Lyzenga (ERIM, Ann Arbor) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 169-178 refs (For primary document see N84-27262 17-43)
(NASA Order W-15084; Contract N00014-81-C-0692)
Avail: NTIS HC A99/MF A01 CSCL 17I

The intensity wave like patterns observed in Synthetic Aperture Radar (SAR) are known to be caused by two mechanisms: the microwave radar cross sectional amplitude modulation due to tilt and hydrodynamic interaction of the long ocean waves, and intensity modulation due to the motion of the long ocean waves. Two dimensional closed form expressions of intensity wave patterns based on ocean wave swell are developed. They illustrate the relative importance of the amplitude and motion modulations; they also show that velocity bunching and a distortion due to the phase velocity of the ocean wave field are independent of the focus adjustment, provided that the second order temporal effects are neglected. Second order effects are small only over a limited range of ocean/radar parameters. M.A.C.

N84-27279*# Royal Norwegian Council for Scientific and Industrial Research, Kjeller. Environmental Surveillance Technology Programme.

OCEAN WAVES AND TURBULENCE AS OBSERVED WITH AN ADAPTIVE COHERENT MULTIFREQUENCY RADAR c32

Dag T. Gjessing and Jens Hjelmstad *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 179-191 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 17I

An adaptive coherent multifrequency radar system is developed for several applications. The velocity distribution (Doppler spectrum) and spectral intensity of 15 different irregularity scales (waves and turbulence) can be measured simultaneously. Changing the azimuth angle of the antennas at regular intervals, the directivity of the wave/turbulence pattern on the sea surface can also be studied. A series of measurements for different air/sea conditions are carried out from a coast based platform. Experiments in the Atlantic are also performed with the same equipment making use of the NASA Electra aircraft. The multifrequency radar allows the measurement of the velocity distribution ("coherent and incoherent component") associated with 15 different ocean irregularity scales simultaneously in a directional manner. It is possible to study the different air/sea mechanisms in some degree of detail. M.A.C.

N84-27280*# Naval Research Lab., Washington, D. C.

THE DUAL-FREQUENCY SCATTEROMETER REEXAMINED c35

William J. Plant and A. B. Reeves *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 193-198 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 14B

The utility of dual frequency scatterometers in measuring ocean wave directional spectra can be increased by adding third frequency to the system. The background which effectively limits signal detectability in dual frequency operation can be made a part of the signal through the addition of this third frequency. Signal detectability is limited only by system thermal noise and space based operation becomes more feasible. M.A.C.

N84-27281*# Naval Research Lab., Washington, D. C.

AN IMPROVED DUAL-FREQUENCY TECHNIQUE FOR THE REMOTE SENSING OF OCEAN CURRENTS AND WAVE SPECTRA

Dale L. Schuler and Wah P. Eng *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and

Troposphere from Air and Space Platforms May 1984 p 199-214 refs (For primary document see N84-27262 17-43) .
Avail: NTIS HC A99/MF A01 CSCL 08C

A two frequency microwave radar technique for the remote sensing of directional ocean wave spectra and surface currents is investigated. This technique is conceptually attractive because its operational physical principle involves a spatial electromagnetic scattering resonance with a single, but selectable, long gravity wave. Multiplexing of signals having different spacing of the two transmitted frequencies allows measurements of the entire long wave ocean spectrum to be carried out. A new scatterometer is developed and experimentally tested which is capable of making measurements having much larger signal/background values than previously possible. This instrument couples the resonance technique with coherent, frequency agility radar capabilities. This scatterometer is presently configured for supporting a program of surface current measurements. M.A.C.

N84-27282*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEASUREMENTS OF OCEAN WAVE SPECTRA AND MODULATION TRANSFER FUNCTION WITH THE AIRBORNE TWO FREQUENCY SCATTEROMETER c48
David E. Weissman (Hofstra Univ.) and James W. Johnson *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 215-232 refs (For primary document see N84-27262 17-43)
(Grant NAGw-468)
Avail: NTIS HC A99/MF A01 CSCL 08C

The directional spectrum and the microwave modulation transfer function of ocean waves can be measured with the airborne two frequency scatterometer technique. Similar to tower based observations, the aircraft measurements of the Modulation Transfer Function (MTF) show that it is strongly affected by both wind speed and sea state. Also detected are small differences in the magnitudes of the MTF between downwind and upwind radar look directions, and variations with ocean wavenumber. The MTF inferred from the two frequency radar is larger than that measured using single frequency, wave orbital velocity techniques such as tower based radars or ROWS measurements from low altitude aircraft. Possible reasons for this are discussed. The ability to measure the ocean directional spectrum with the two frequency scatterometer, with supporting MTF data, is demonstrated. M.A.C.

N84-27283*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME CASE STUDIES OF OCEAN WAVE PHYSICAL PROCESSES UTILIZING THE GSFC AIRBORNE RADAR OCEAN WAVE SPECTROMETER c48
Fred C. Jackson *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 233-245 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

The NASA K sub u band Radar Ocean Wave Spectrometer (ROWS) is an experimental prototype of a possible future satellite instrument for low data rate global waves measurements. The ROWS technique, which utilizes short pulse radar altimeters in a conical scan mode near vertical incidence to map the directional slope spectrum in wave number and azimuth, is briefly described. The potential of the technique is illustrated by some specific case studies of wave physical processes utilizing the aircraft ROWS data. These include: (1) an evaluation of numerical hindcast model performance in storm sea conditions, (2) a study of fetch limited wave growth, and (3) a study of the fully developed sea state. Results of these studies, which are briefly summarized, show how directional wave spectral observations from a mobile platform can contribute enormously to our understanding of wave physical processes. Author

N84-27284*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NON-GAUSSIAN STATISTICAL MODELS OF SURFACE WAVE FIELDS FOR REMOTE SENSING APPLICATIONS
Norden E. Huang *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 247-255 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

Based on the complete Stokes wave model with the bias term and using a simple mapping approach and an iteration solution method, we established a formula for the joint probability density function of the surface slope elevation of a nonlinear random wave field. The formula requires three parameters to define the whole density function: the rms surface elevation and slope values and the significant slope. This model represents the dynamics of the wave in a more direct way than the Gram-Charlier approximation. Based on this new statistical model and laboratory experiments, formula and numerical values of EM bias and dynamics bias are derived. The results indicate that various biases should be considered seriously if accuracy of the altimeter measurement is required in centimeter range. Author

N84-27285*# Universite Catholique de Louvain (Belgium). Faculte des Sciences Appliquees.
A TENTATIVE UNIFIED SEA MODEL FOR SCATTERING AND EMISSION Abstract Only c48
A. Guissard and P. Sobieski *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 257 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

This work is an attempt to relate active and passive observations of the sea surface to each other, considering that more information can be obtained from a set of instruments when they are not just considered as a juxtaposition of separate and independent boxes, but as a single complex instrument. A careful review of several approaches to the solution of the scattering problem for a random rough surface has been performed. Inherent simplifications, and inconsistencies, are pointed out. To reduce the computation time to reasonable values, an approximate model is selected and some numerical results will be presented in order to illustrate the benefit that can be gained by a unified approach. B.W.

N84-27286*# National Center for Atmospheric Research, Boulder, Colo.
APPLICATIONS OF AIRBORNE REMOTE SENSING IN ATMOSPHERIC SCIENCES RESEARCH c48
Robert J. Serafin, Gerard Szejwach (Lab. de Meteorologie Dynamique, Palaiseau, France), and Byron B. Phillips *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 259-269 refs Sponsored by NSF (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04A

This paper explores the potential for airborne remote sensing for atmospheric sciences research. Passive and active techniques from the microwave to visible bands are discussed. It is concluded that technology has progressed sufficiently in several areas that the time is right to develop and operate new remote sensing instruments for use by the community of atmospheric scientists as general purpose tools. Promising candidates include Doppler radar and lidar, infrared short range radiometry, and microwave radiometry. Author

N84-27287*# National Center for Atmospheric Research, Boulder, Colo.
EVALUATION OF METEOROLOGICAL AIRBORNE DOPPLER RADAR c32
Peter H. Hildebrand and Cynthia K. Mueller *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 271-280 refs Sponsored by NSF (For primary document see N84-27262 17-43)

(NASA Order H-59314-B; Contract DTFA01-82-Y-10513)
Avail: NTIS HC A99/MF A01 CSCL 17I

This paper will discuss the capabilities of airborne Doppler radar for atmospheric sciences research. The evaluation is based on airborne and ground based Doppler radar observations of convective storms. The capability of airborne Doppler radar to measure horizontal and vertical air motions is evaluated. Airborne Doppler radar is shown to be a viable tool for atmospheric sciences research. Author

N84-27288*# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
MICROWAVE REMOTE SENSING OF OCEAN SURFACE WIND SPEED AND RAIN RATES OVER TROPICAL STORMS c47
Calvin T. Swift, D. C. Dehority, Peter G. Black (NOAA, Miami, Fla.), and Jian-Zhong Chien (Tsinghua Univ., China) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 281-286 ref (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

The value of using narrowly spaced frequencies within a microwave band to measure wind speeds and rain rates over tropical storms with radiometers is reviewed. The technique focuses on results obtained in the overflights of Hurricane Allen during 5 and 8 of August, 1980. Author

N84-27289*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ALTIMETER HEIGHT MEASUREMENT ERRORS INTRODUCED BY THE PRESENCE OF VARIABLE CLOUD AND RAIN ATTENUATION
Francis M. Monaldo, Julius Goldhirsh, and Edward J. Walsh *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 287-296 refs Prepared in cooperation with APL, Laurel, Md. (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 20N

It has recently been recognized that spatially inhomogeneous clouds and rain can substantially affect the height precision obtainable from a spaceborne radar altimeter system. Through computer simulation, it has been found that typical levels of cloud and rain intensities and associated spatial variabilities may degrade altimeter precision at 13.5 GHz and, in particular, cause severe degradation at 35 GHz. This degradation in precision is a result of radar signature distortion caused by variable attenuation over the beam limited altimeter footprint. Because attenuation effects increase with frequency, imprecision caused by them will significantly impact on the frequency selection of future altimeters. In this paper the degradation of altimeter precision introduced by idealized cloud and rain configurations as well as for a realistic rain configuration as measured with a ground based radar is examined. B.W.

N84-27290*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
IMPROVED RESOLUTION RAIN MEASUREMENTS FROM SPACEBORNE RADAR ALTIMETERS c32
Julius Goldhirsh and Frank M. Monaldo *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 297-306 refs Sponsored by NASA. Goddard Space Flight Center and NASA. Wallops Flight Center (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 20N

Rain measurement of the type described here are considered vital from the standpoint of representing a flag for altimeter data that may be corrupted by rain. It also provides sorely needed rain data over the oceans where little or no such data is available. It is demonstrated that improved resolution measurements of precipitation may be obtained from satellite borne radars with antenna beams having relatively large surface footprints. The method employs deconvolution and Fourier transform procedures, and assumes a knowledge of the antenna beam pattern. As an example, the technique is specifically directed towards the application of future spaceborne radar altimeters which may contain additional range gates to enable the measurement of rain at altitude. It is demonstrated that because of the natural variability of rain in the lateral extent, the standard beam averaging over the footprint could easily produce erroneous interpretations of the intensity of rain and its extent. On the other hand, many of these ambiguities may be removed employing the deconvolution techniques described. Author

N84-27291*# Washington Univ., Seattle. Dept. of Atmospheric Sciences.
OBSERVING ATMOSPHERIC WATER IN STORMS WITH THE NIMBUS 7 SCANNING MULTICHANNEL MICROWAVE RADIOMETER c47
Kristina B. Katsaros and Robert M. Lewis *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 307-316 refs (For primary document see N84-27262 17-43) (Grant NAG5-354)
Avail: NTIS HC A99/MF A01 CSCL 04B

Employing data on integrated atmospheric water vapor, total cloud liquid water and rain rate obtainable from the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR), we study the frontal structure of several mid-latitude cyclones over the North Pacific Ocean as they approach the West Coast of North America in the winter of 1979. The fronts, analyzed with all available independent data, are consistently located at the leading edge of the strongest gradient in integrated water vapor. The cloud liquid water content, which unfortunately has received very little in situ verification, has patterns which are consistent with the structure seen in visible and infrared imagery. The rain distribution is also a good indicator of frontal location and rain amounts are generally within a factor of two of what is observed with rain gauges on the coast. Furthermore, the onset of rain on the coast can often be accurately forecast by simple advection of the SMMR observed rain areas. Author

N84-27292*# Kiel Univ. (West Germany).
TEMPERATURE AND HUMIDITY PROFILES IN THE ATMOSPHERE FROM SPACEBORNE LASERS: A FEASIBILITY STUDY c46
Hartmut Grassl and Peter Schluessel *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 317-326 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04A

Computer simulations of the differential absorption lidar technique in a space craft for the purpose of temperature and humidity profiling indicate: (1) Current technology applied to O2 and H2O lines in the .7 to .8 micrometers wavelength band gives sufficiently high signal-to-noise ratios (up to 50 for a single pulse pair) if backscattering by aerosol particles is high, i.e. profiling accurate to 2 K for temperature and 10% for humidity should be feasible within the turbid lower troposphere in 1 km layers and with an averaging over approximately 100 pulses. (2) The impact of short term fluctuations in aerosol particle concentration is too big for a one laser system. Only a two laser system firing at a time lag of about 1 millisecond can surmount these difficulties. (3) The finite width of the laser line and the quasi-random shift of this line introduce tolerable, partly systematic errors. Author

N84-27293*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
A NEW TECHNIQUE FOR MONITORING THE WATER VAPOR IN THE ATMOSPHERE c46
Harold D. Black and Arie Eisner *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 327-336 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04A

In the correction of satellite Doppler data for tropospheric effects the precipitable water vapor (PWV) is inferred at the tracking

site. The technique depends on: (1) an ephemeris for the satellite; (2) an analytic model for the refraction range effect that is good to a few centimeters; (3) Doppler data with noise level below 10 centimeters; and (4) a surface pressure/temperature measurement at the tracking site. The PWV is a by product of the computation necessary to correct the Doppler data for tropospheric effects. A formulation of the refraction integral minimizes the necessity for explicit water vapor, temperature and pressure profiles. E.A.K.

N84-27294*# Bar-Ilan Univ., Ramat-Gan (Israel). Dept. of Geography.

CASE STUDIES OF NOAA 6/TIROS N DATA IMPACT ON NUMERICAL WEATHER FORECASTS c47

Leonard M. Druyan, Zvi Alperson (Israel Meteorological Service, Bet-Degan), and Tamar Ben-Amram (Israel Meteorological Service, Bet-Degan) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 337-344 refs Sponsored by NOAA (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 04B

The impact of satellite temperatures from systems which predate the launching of the third generation of vertical sounding instruments aboard TIROS N (13 Oct 1978) and NOAA 6 (27 June 1979) is reported. The first evaluation of soundings from TIROS N found that oceanic, cloudy retrievals over NH mid latitudes show a cold bias in winter. It is confirmed for both satellite systems using a larger data base. It is shown that RMS differences between retrievals and colocated radiosonde observations within the swath 30-60N during the 1979-80 winter were generally 2-3K in clear air and higher for cloudy columns. A positive impact of TIROS N temperatures on the analysis of synoptic weather systems is shown. Analyses prepared from only satellite temperatures seemed to give a better definition to weather systems' thermal structure than that provided by corresponding NMC analyses without satellite data. The results of a set of 14 numerical forecast experiments performed with the PE model of the Israel Meteorological Service (IMS) are summarized; these were designed to test the impact of TIROS N and NOAA 6 temperatures within the IMS analysis and forecast cycle. The satellite data coverage over the NH, the mean area/period S1 and RMS verification scores and the spatial distribution of SAT versus NO SAT forecast differences are discussed and it is concluded that positive forecast impact occurs over ocean areas where the extra data improve the specification which is otherwise available from conventional observations. The forecast impact for three cases from the same set of experiments was examined and it is found that satellite temperatures, observed over the Atlantic Ocean contribute to better forecasts over Iceland and central Europe although a worse result was verified over Spain. It is also shown that the better scores of a forecast based also on satellite data and verified over North America actually represent a mixed impact on the forecast synoptic patterns. A superior 48 hr 500 mb forecast over the western US due to the better initial specification afforded by satellite observed temperatures over the North Pacific Ocean is shown. E.A.K.

N84-27295*# National Oceanic and Atmospheric Administration, Washington, D. C. National Environmental Satellite, Data and Information Service.

THE IMPACT OF SATELLITE TEMPERATURE SOUNDINGS ON THE FORECASTS OF A SMALL NATIONAL METEOROLOGICAL SERVICE c47

Noah Wolfson (NAS-NRC), Albert Thomasell, Zvi Alperson (Israel Meteorological Service, Bet-Dagan), Harold Brodrick, Jy-Tai Chang (Systems and Applied Sciences Corp.), Arnold Gruber, and George Ohring *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 345-356 refs (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 04B

The impact of introducing satellite temperature sounding data on a numerical weather prediction model of a national weather service is evaluated. A dry five level, primitive equation model which covers most of the Northern Hemisphere, is used for these experiments. Series of parallel forecast runs out to 48 hours are made with three different sets of initial conditions: (1) NOSAT runs, only conventional surface and upper air observations are used; (2) SAT runs, satellite soundings are added to the conventional data over oceanic regions and North Africa; and (3) ALLSAT runs, the conventional upper air observations are replaced by satellite soundings over the entire model domain. The impact on the forecasts is evaluated by three verification methods: the RMS errors in sea level pressure forecasts, systematic errors in sea level pressure forecasts, and errors in subjective forecasts of significant weather elements for a selected portion of the model domain. For the relatively short range of the present forecasts, the major beneficial impacts on the sea level pressure forecasts are found precisely in those areas where the satellite sounding are inserted and where conventional upper air observations are sparse. The RMS and systematic errors are reduced in these regions. The subjective forecasts of significant weather elements are improved with the use of the satellite data. It is found that the ALLSAT forecasts are of a quality comparable to the SAR forecasts. E.A.K.

N84-27296*# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.

THE VARIABILITY OF THE SURFACE WIND FIELD IN THE EQUATORIAL PACIFIC OCEAN: CRITERIA FOR SATELLITE MEASUREMENTS c47

David Halpern *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 357-366 refs (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 04B

The natural variability of the equatorial Pacific surface wind field is described from long period surface wind measurements made at three sites along the equator (95 deg W, 109 deg 30 W, 152 deg 30 W). The data were obtained from surface buoys moored in the deep ocean far from islands or land, and provide criteria to adequately sample the tropical Pacific winds from satellites. E.A.K.

N84-27297*# National Oceanic and Atmospheric Administration, Washington, D. C. National Environmental Satellite, Data, and Information Service.

RECENT ADVANCES IN MULTISPECTRAL SENSING OF OCEAN SURFACE TEMPERATURE FROM SPACE

E. Paul McClain *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 367-376 refs (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 08C

Visual and infrared measurements from the five channel AVHRR on the NOAA-7 satellite are used operationally to derive sea surface temperatures. The multichannel data perform daytime and nighttime cloud detection tests, and the several atmospheric window channels in the thermal infrared correct for atmospheric attenuation. Monitoring of the sea surface temperature product with buoy data indicates stability in mean bias and rms difference with little variation by season or geographic area. Global mapping enables the derivation of monthly mean isotherms, monthly and annual changes, and anomaly patterns relative to climatology. Problems are associated with noise in the 3.7 micro m window channel, and with the injection of substantial volcanic aerosol into the stratosphere by the El Chichon eruption. Multichannel sea surface temperature charts are used to study phenomena such as equatorial long waves and the recent El Nino episode. E.A.K.

N84-27298*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

SATELLITE TECHNIQUES FOR DETERMINING THE GEOPOTENTIAL FOR SEA-SURFACE ELEVATIONS

Vincent L. Pisacane *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 377-388 refs (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 08C

Spaceborne altimetry with measurement accuracies of a few centimeters which has the potential to determine sea surface elevations necessary to compute accurate three-dimensonal geostrophic currents from traditional hydrographic observation is discussed. The limitation in this approach is the uncertainties in knowledge of the global and ocean geopotentials which produce satellite and height uncertainties about an order of magnitude larger than the goal of about 10 cm. The quantative effects of geopotential uncertainties on processing altimetry data are described. Potential near term improvements, not requiring additional spacecraft, are discussed. Even though there is substantial improvements at the longer wavelengths, the oceanographic goal will be achieved. The geopotential research mission (GRM) is described which should produce goepotential models that are capable of defining the ocean geid to 10 cm and near-Earth satellite position. The state of the art and the potential of spaceborne gravimetry is described as an alternative approach to improve our knowledge of the geopotential. E.A.K.

N84-27299*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Remote Sensing Branch.

THE SATELLITE ALTIMETER AS A PLATFORM FOR OBSERVATION OF THE OCEANIC MESOSCALE Abstract Only

Jim L. Mitchell *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 389 (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 08C

The use of the satellite radar altimeter as a platform to provide synoptic monitoring of the oceanic mesoscale is faced with two critical issues: removal of geoid error or contamination and election of optimum space/time sampling strategies. Long wavelength orbit determination errors are not critical problems for altimeter measurements of the basin scale circulation. Both issues are addressed within the constraints provided by orbital mechanics which dictates the laydown pattern of the satellite's groundtracks in space/time. Other issues which must be assessed are: adequate mission duration scales and the problems of geophysical noise sources and instrumental noise which degrade the effective alongtrack spatial resolution of the altimeter. E.A.K.

N84-27300*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE EVOLUTIONARY TREND IN AIRBORNE AND SATELLITE RADAR ALTIMETERS c32

Leonard S. Fedor (NOAA, Boulder, Colo.) and Edward J. Walsh *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 391-402 refs (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 17I

The manner in which airborne and satellite radar altimeters developed and where the trend is leading was investigated. The airborne altimeters have progressed from a broad beamed, narrow pulsed, nadir looking instrument, to a pulse compressed system that is computer controlled, to a scanning pencil beamed system which produce a topographic map of the surface beneath the aircraft in real time. It is suggested that the airborne systems lie in the use of multiple frequencies. The satellite altimeters evolve towards multifrequency systems with narrower effective pulses and higher pulse compression ratios to reduce peak transmitted power while improving resolution. Applications indicate wide swath systems using interferometric techniques or beam limited systems using 100 m diameter antennas. E.A.K.

N84-27301*# Max-Planck-Institut fuer Meteorologie, Hamburg (West Germany).

ON THE DETECTION OF UNDERWATER BOTTOM TOPOGRAPHY BY IMAGING RADARS c32

Werner Alpers *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 403-413 refs (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 17I

A theoretical model which explains basic properties of radar imaging of underwater bottom topography in tidal channels is presented. The surface roughness modulation is described by weak hydrodynamic interaction theory in the relaxation time approximation. In contrast to previous theories on short wave modulation by long ocean waves, a different approximation is used to describe short wave modulation by tidal flow over underwater bottom topography. The modulation depth is proportional to the relaxation time of the Bragg waves. The large modulation of radar reflectivity observed in SEASAT-SAR imagery of sand banks in the Southern Bight of the North Sea are explained by assuming that the relaxation time of 34 cm Bragg waves is of the order of 30-40 seconds. E.A.K.

N84-27302*# Environmental Research Inst. of Michigan, Ann Arbor. Radar Div.

MODELING OF SAR SIGNATURES OF SHALLOW WATER OCEAN TOPOGRAPHY c48

Robert A. Shuchman, A. Kozma, E. S. Kasischke, and D. R. Lyzenga *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 415-430 refs (For primary document see N84-27262 17-43)

(Contracts N00014-81-C-2254; DMA800-78-C-0060; N00014-81-C-2308; N00014-81-C-0692)

Avail: NTIS HC A99/MF A01 CSCL 08C

A hydrodynamic/electromagnetic model was developed to explain and quantify the relationship between the SEASAT synthetic aperture radar (SAR) observed signatures and the bottom topography of the ocean in the English Channel region of the North Sea. The model uses environmental data and radar system parameters as inputs and predicts SAR-observed backscatter changes over topographic changes in the ocean floor. The model results compare favorably with the actual SEASAT SAR observed backscatter values. The developed model is valid for only relatively shallow water areas (i.e., less than 50 meters in depth) and suggests that for bottom features to be visible on SAR imagery, a moderate to high velocity current and a moderate wind must be present. E.A.K.

N84-27303*# Tel-Aviv Univ. (Israel). Faculty of Engineering.

COASTAL BATHYMETRY AND CURRENTS FROM LANDSAT DATA Abstract Only c48

Norman Rosenberg *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 431 (For primary document see N84-27262 17-43)

Avail: NTIS HC A99/MF A01 CSCL 08C

LANDSAT scenes of coastal areas should be useful for bathymetry and for mapping sediment flow if scatter from bottom and suspended matter can be separated by multi-date analysis. Several filter algorithms have been developed to reduce both artifacts and random noise while retaining meaningful structures such as breakwaters and underwater reefs. Results of application of these filters to LANDSAT scenes of the Israeli coast are presented. Author

N84-27304*# Johns Hopkins Univ., Baltimore, Md. Dept. of Earth and Planetary Sciences.

ON THE RESPONSE TO OCEAN SURFACE CURRENTS IN SYNTHETIC APERTURE RADAR IMAGERY c48

O. M. Phillips *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 433-452 refs (For primary document see N84-27262 17-43)

(Grant NAGw-304; Contract N00014-76-c-0184)

Avail: NTIS HC A99/MF A01 CSCL 08C

The balance of wave action spectral density for a fixed wave-number is expressed in terms of a new dimensionless function, the degree of saturation, b, and is applied to an analysis of the variations of this quantity (and local spectral level) at wave-numbers large compared to that of the spectral peak, that

are produced by variations in the ocean surface currents in the presence of wind input and wave breaking. Particular care is taken to provide physically based representations of wind input and loss by wave breaking and a relatively convenient equation is derived that specifies the distribution of the degree of saturation in a current field, relative to its ambient (undisturbed) background in the absence of currents. The magnitude of the variations in b depends on two parameters, U(o)/c, where U/(o) is the velocity scale of the current and c the phase speed of the surface waves at the (fixed) wave-number considered or sampled by SAR, and S = (L/lambda) (u*/c)(2), where L is the length scale of the current distribution, lambda the wavelength of the surface waves the length scale of the current distribution, lambda the wavelength of the surface waves and u* the friction velocity of the wind. M.G.

N84-27305*# British Columbia Univ., Vancouver. Dept. of Oceanography.
VARIATIONS IN SURFACE CURRENT OFF THE COASTS OF CANADA AS INFERRED FROM INFRARED SATELLITE IMAGERY c48
W. J. Emery, M. Ikeda, L. A. Mysak, and P. H. LeBlond *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 453-478 refs Sponsored by Natural Sciences and Engineering Research Council of Canada (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

Infrared satellite images of sea surface temperature are used to infer changes in the surface currents off both the east and west coasts of Canada. Off the east coast, summer infrared temperature patterns suggest a close connection between the location of the continental slope and the path of the Labrador Current as marked by a strong change in the shape of the continental slope. In winter both infrared and visible imagery reveal the southward propagation of wavelike features in the ice patterns along the Labrador coast. A large number of images from the Canadian west coast were used to depict the evolution of surface temperature features. In winter and spring 150 km current meanders are fed energy by the baroclinic instability of the uniformly directed current which flows northwest in winter and southeast in spring. In summer the surface current is directed southeastward while below it an undercurrent flows to the northeast. Initiated by an interaction with the irregularities of the local continental slope 75 km current meanders begin to form. Energy is then fed non-linearly by baroclinic instability into longer scale 150 km meander which eventually shed to form separate eddies. M.G.

N84-27306*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
THE DEPICTION OF ALBORAN SEA GYRE DURING DONDE VA? USING REMOTE SENSING AND CONVENTIONAL DATA c48
Paul E. LaViolette *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 479-496 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

Experienced oceanographic investigators have come to realize that remote sensing techniques are most successful when applied as part of programs of integrated measurements aimed at solving specific oceanographic problems. A good example of such integration occurred during the multi-platform international experiment, Donde Va? in the Alboran Sea during the period June through October, 1982. The objective of Donde Va? was to derive the interrelationship of the Atlantic waters entering the Mediterranean Sea and the Alboran Sea Gyre. The experimental plan conceived solely with this objective in mind consisted of a variety of remote sensing and conventional platforms: three ships, three aircraft, five current moorings, two satellites and a specialized beach radar (CODAR). Integrated analyses of these multiple-data sets are still being conducted. However, the initial results show detailed structure of the incoming Atlantic jet and Alboran Sea Gyre that would not have been possible by conventional means. Author

N84-27307*# Institut de Physique du Globe, Paris (France). Lab. de Physique et Chimie de l'Hydrosphere.
SOMALI CURRENT STUDIED FROM SEASAT ALTIMETRY c48
C. Perigaud, J.-F. Minster, V. Zlotnicki (MIT, Cambridge), and G. Balmino (CNES, Toulouse, France) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 497-499 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

Mesoscale variability has been obtained for the world ocean from satellite altimetry by using the repetitive tracks data of SEASAT. No significant results were obtained for the Somali current area for two main reasons: the repetitive tracks are too sparse to cover the expected eddy pattern and these data were obtained in late September and early October when the current is strongly decaying. The non-repetitive period of SEASAT offers the possibility to study a dozen of tracks parallel to the eddy axis or crossing it. These are used here to deduce the dynamic topography of the Somali current. Data error reduction and tide and orbit corrections are addressed. A local geoid was built using a collocation inverse method to combine surface gravity data and altimetry: the repetitive tracks show no variability (which confirms that the current is quasi-inexistent at that time) and can be used as data for the local geoid. This should provide a measure of the absolute dynamic topography of the Somali current. M.G.

N84-27308*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SATELLITE REMOTE SENSING OVER ICE
Robert H. Thomas *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 501-512 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08L

Satellite remote sensing provides unique opportunities for observing ice-covered terrain. Passive-microwave data give information on snow extent on land, sea-ice extent and type, and zones of summer melting on the polar ice sheets, with the potential for estimating snow-accumulation rates on these ice sheets. All weather, high-resolution imagery of sea ice is obtained using synthetic aperture radars, and ice-movement vectors can be deduced by comparing sequential images of the same region. Radar-altimetry data provide highly detailed information on ice-sheet topography, with the potential for deducing thickening/thinning rates from repeat surveys. The coastline of Antarctica can be mapped accurately using altimetry data, and the size and spatial distribution of icebergs can be monitored. Altimetry data also distinguish open ocean from pack ice and they give an indication of sea-ice characteristics. Author

N84-27309*# Science Research Council, Chilton (England).
RADAR ALTIMETRY OVER SEA ICE Abstract Only
John Powell *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 513 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08L

To study the sea-ice interactive region in the Bering and Greenland Seas a series of experimental compaigns, the Marginal Ice Zone Experiment (MIZEX) has been planned. A major objective of MIZEX is the development of a capability to relate the morphology and distribution of the sea ice to atmospheric and oceanographic parameters in an overall model. During the first part of the MIZEX, a 13.7 GHz microwave radar altimeter/scatterometer having a pulse length of 16 nanoseconds was flown over the Bering Sea Marginal ice zone. On the same aircraft were the NASA GSFC 19 GHz Electronically Scanning Microwave Radiometer (ESMR), scanning radiometers and an infrared, nadir pointing, temperature sounder. The altimeter/scatterometer was operated in nadir pointing and conically scanning modes to collect measurements of reflectivity and pulse shapes. These will be related to sea-ice classifications, ocean wave spectra and coinci-

dent microwave and infrared radiometric measurements and laser profilometer surface roughness estimates. M.G.

N84-27310*# Bar-Ilan Univ., Ramat-Gan (Israel). Dept. of Geography.
METHOD TO ESTIMATE DRAG COEFFICIENT AT THE AIR/ICE INTERFACE OVER DRIFTING OPEN PACK ICE FROM REMOTELY SENSED DATA
Uri Feldman *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 515-526 refs Sponsored by Natural Sciences and Engineering Research Council of Canada and Atmospheric Environment Service (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08L

A knowledge in near real time, of the surface drag coefficient for drifting pack ice is vital for predicting its motions. And since this is not routinely available from measurements it must be replaced by estimates. Hence, a method for estimating this variable, as well as the drag coefficient at the water/ice interface and the ice thickness, for drifting open pack ice was developed. These estimates were derived from three-day sequences of LANDSAT-1 MSS images and surface weather charts and from the observed minima and maxima of these variables. The method was tested with four data sets in the southeastern Beaufort sea. Acceptable results were obtained for three data sets. Routine application of the method depends on the availability of data from an all-weather air or spaceborne remote sensing system, producing images with high geometric fidelity and high resolution. M.G.

N84-27311*# University Coll., Dorking (England). Dept. of Physics and Astronomy.
OBSERVATIONS OF SEA ICE AND ICEBERGS FROM SATELLITE RADAR ALTIMETERS
C. G. Rapley *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 527-536 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08L

Satellite radar altimeters can make useful contributions to the study of sea ice both by enhancing observations from other instruments and by providing a unique probe of ocean-ice interaction in the Marginal Ice Zone (MIZ). The problems, results and future potential of such observations are discussed. Author

N84-27312*# Harvard Univ., Cambridge, Mass. Center for Earth and Planetary Physics.
SIMULATION AND ASSIMILATION OF SATELLITE ALTIMETER DATA AT THE OCEANIC MESOSCALE
Pierre DeMay and Allan R. Robinson *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 537-536 refs (For primary document see N84-27262 17-43)
(Contract N00014-75-C-0225)
Avail: NTIS HC A99/MF A01 CSCL 05B

An improved 'objective analysis' technique is used along with an altimeter signal statistical model, an altimeter noise statistical model, an orbital model, and synoptic surface current maps in the POLYMODE-SDE area, to evaluate the performance of various observational strategies in catching the mesoscale variability at mid-latitudes. In particular, simulated repetitive nominal orbits of ERS-1, TOPEX, and SPOT/POSEIDON are examined. Results show the critical importance of existence of a subcycle, scanning in either direction. Moreover, long repeat cycles (> 20 days) and short cross-track distances (< 300 km) seem preferable, since they match mesoscale statistics. Another goal of the study is to prepare and discuss sea-surface height (SSH) assimilation in quasigeostrophic models. Restored SSH maps are shown to meet that purpose, if an efficient extrapolation method or deep in-situ data (floats) are used on the vertical to start and update the model M.G.

N84-27313*# City Coll. of the City Univ. of New York.
VECTOR WIND, HORIZONTAL DIVERGENCE, WIND STRESS AND WIND STRESS CURL FROM SEASAT-SASS AT ONE DEGREE RESOLUTION c47
Willard J. Pierson, Jr., Winfield B. Sylvester, and Robert E. Salfi (Hofstra Univ., Hempstead, N.Y.) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 557-566 refs (For primary document see N84-27262 17-43)
(Grant NAGw-266)
Avail: NTIS HC A99/MF A01 CSCL 04B

Conventional data obtained in 1983 are contrasted with SEASAT-A scatterometer and scanning multichannel microwave radiometer (SMMR) data to show how observations at a single station can be extended to an area of about 150,000 square km by means of remotely sensed data obtained in nine minutes. Superobservations at a one degree resolution for the vector winds were estimated along with their standard deviations. From these superobservations, the horizontal divergence, vector wind stress, and the curl of the wind stress can be found. Weather forecasting theory is discussed and meteorological charts of the North Pacific Ocean are presented. Synoptic meteorology as a technique is examined. R.S.F.

N84-27314*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE IMPACT OF SCATTEROMETER WIND DATA ON GLOBAL WEATHER FORECASTING c47
David Atlas, W. E. Baker, E. Kalnay, M. Halem, Peter M. Woiceshyn (JPL, Pasadena, Calif.), and Steven Peteherych (Atmospheric Environment Service, Downsview, Ontario) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 567-573 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

The impact of SEASAT-A scatterometer (SASS) winds on coarse resolution atmospheric model forecasts was assessed. The scatterometer provides high resolution winds, but each wind can have up to four possible directions. One wind direction is correct; the remainder are ambiguous or 'aliases'. In general, the effect of objectively dealiased-SASS data was found to be negligible in the Northern Hemisphere. In the Southern Hemisphere, the impact was larger and primarily beneficial when vertical temperature profile radiometer (VTPR) data was excluded. However, the inclusion of VTPR data eliminates the positive impact, indicating some redundancy between the two data sets. R.S.F.

N84-27315*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FIRST GLOBAL ANALYSIS OF SEASAT SCATTEROMETER WINDS AND POTENTIAL FOR METEOROLOGICAL RESEARCH c47
Steven Peteherych (Atmospheric Environment Service, Downsview, Ontario), Morton G. Wurtele (California Univ., Los Angeles), Peter M. Woiceshyn (JPL, Pasadena, Calif.), Dale H. Boggs (DB Systems Ltd., Inc., La Canada, Calif.), and Robert R. Atlas *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 575-585 refs (For primary document see N84-27262 17-43)
(Contract NAS7-918)
Avail: NTIS HC A99/MF A01 CSCL 04B

The first global wind fields from SEASAT-A scatterometer (SASS) data were produced. Fifteen days of record are available on tape, with unique wind directions indicated for each observation. The methodology of the production of this data set is described, as well as the testing of its validity. A number of displays of the data, on large and small scales, analyzed and gridded, are provided. R.S.F.

N84-27316*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
THE IMPORTANCE OF ALTIMETER AND SCATTEROMETER

DATA FOR OCEAN PREDICTION c48
Harley E. Hurlburt *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 587-599 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

The prediction of ocean circulation using satellite altimeter data is discussed. Three classes of oceanic response to atmospheric forcing are outlined and examined. Storms, surface waves, eddies, and ocean currents were evaluated in terms of forecasting time requirements. Scatterometer and radiometer applications to ocean prediction are briefly reviewed. R.S.F.

N84-27317*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Dynamical Ocean Forecasting Branch.
SAMPLING STRATEGIES AND FOUR-DIMENSIONAL ASSIMILATION OF ALTIMETRIC DATA FOR OCEAN MONITORING AND PREDICTION c48
John C. Kindle, J. Dana Thompson, and Harley E. Hurlburt *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 601-612 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

Numerical experiments using simulated altimeter data were conducted in order to examine the assimilation of altimeter-derived sea surface heights into numerical ocean circulation models. A reduced-gravity, primitive equation circulation model of the Gulf of Mexico was utilized; the Gulf of Mexico was chosen because of its amenability to modeling and the ability of low vertical-mode models to reproduce the observed dynamical features of the Gulf circulation. The simulated data were obtained by flying an imaginary altimeter over the model ocean and sampling the model sea surface just as real altimeter would observe the true ocean. The data were used to initialize the numerical model and the subsequent forecast was compared to the true numerical solution. Results indicate that for a stationary, circular eddy, approximately three to four tracks (either ascending or descending) across the eddy are sufficient to ensure adequate spatial resolution. Author

N84-27318*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Dynamic Ocean Forecasting Branch.
THE INFLUENCE OF ACTUAL AND APPARENT GEOID ERROR ON OCEAN ANALYSIS AND PREDICTION Abstract Only c48
J. Dana Thompson *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 613-614 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

The radar altimeter is the only satellite remote sensor with a proven capability for synoptically measuring an integral property of the dynamic ocean on a near global, all weather basis. Because acquisition of global, in situ ocean data with space/time resolution adequate to describe dynamically important ocean features is practically impossible, any attempt to develop a global ocean monitoring and forecasting system will rely heavily on altimetric data for initialization and updating. Maximizing useful information from the altimeter while minimizing error sources and developing methods for assimilating altimeter data into dynamical models are, therefore, vital areas for research and development. The limits imposed on ocean prediction by errors in the geoid or apparent errors associated with ground track variations near strong geopotential gradients are examined. R.S.F.

N84-27319*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MATRIX PARTITIONING AND EOF/PRINCIPAL COMPONENT ANALYSIS OF ANTARCTIC SEA ICE BRIGHTNESS TEMPERATURES
C. W. Murray, Jr., J. L. Mueller (Naval Post Graduate School), and H. J. Zwally Apr. 1984 89 p refs
(NASA-TM-83916; NAS 1.15:83916) Avail: NTIS HC A05/MF A01 CSCL 08L

A field of measured anomalies of some physical variable relative to their time averages, is partitioned in either the space domain or the time domain. Eigenvectors and corresponding principal components of the smaller dimensioned covariance matrices associated with the partitioned data sets are calculated independently, then joined to approximate the eigenstructure of the larger covariance matrix associated with the unpartitioned data set. The accuracy of the approximation (fraction of the total variance in the field) and the magnitudes of the largest eigenvalues from the partitioned covariance matrices together determine the number of local EOF's and principal components to be joined by any particular level. The space-time distribution of Nimbus-5 ESMR sea ice measurement is analyzed. A.R.H.

N84-27320# Environmental Research Inst. of Michigan, Ann Arbor.
ANALYSIS OF SEASAT SAR IMAGERY COLLECTED DURING THE JASIN EXPERIMENT Topic Report, Aug. 1981 - May 1983
E. S. Kasischke, R. A. Shuchman, J. D. Lyden, and Y. C. Tseng May 1983 209 p
(Contract N00014-81-C-0692)
(AD-A140584; ERIM-155900-16-T) Avail: NTIS HC A10/MF A01 CSCL 08/3

This report summarizes the analysis of SEASAT SAR imagery collected during the JASIN experiment. Studies performed on this data set include comparison of SAR-derived estimates of wavelength and direction versus surface measured values, evaluation of SAR/wave focusing algorithms and study of deep-water internal wave and frontal boundary patterns on the SAR imagery. GRA

N84-27321# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
OCEAN OPTICAL REMOTE SENSING CAPABILITY STATEMENT Final Technical Note
R. A. Arnone and R. J. Holyer Mar. 1984 30 p
(AD-A140589; NORDA-TN-264) Avail: NTIS HC A03/MF A01 CSCL 08/10

The capability of the Naval Ocean Research & Development Activity Remote Sensing Branch in ocean optics is described. A summary of the facilities, programs, scientific contributions and basic research issues is outlined. The application of remote sensing in the study of ocean optical properties is described in addition to present image processing software and satellite receiving capability. Different optical field instruments which the Remote Sensing Branch has obtained are presented. Results of optical data are illustrated in relation to other oceanographic parameters. Navy programs which have supported the Remote Sensing Branch's developments in water optics are described. The Navy relevance of water optics to these programs is indicated. Author (GRA)

N84-27322# University of South Florida, St. Petersburg. Dept. of Marine Science.
EVALUATION OF STOKES SETTLING EQUATION FOR VARIABLE DENSITY AGGREGATES Final Report, 1 Nov. 1982 - 29 Feb. 1984
K. L. Carder and R. G. Steward 26 Apr. 1984 40 p
(Contract N00014-83-K-0082)
(AD-A140878; AD-E500637) Avail: NTIS HC A03/MF A01 CSCL 08/8

Holographic measurements of clay aggregates settling through a density/viscosity gradient revealed that the aggregate pore waters are flushed, affecting the aggregate density and settling speed. The flushed pore waters provide a low viscosity conduit in which subsequent particles settle as much as 25% faster than they would in the surrounding fluid. This conduit is holographically recorded due to its reduced refractive index relative to the surrounding medium. Regions where this phenomenon may play an important role are at river mouths and in shelf/slope density-gradient environments for clay aggregates, and in sea-ice-melt regions and in the microstructure of the thermoclines for low-density biogenous particles. Author (GRA)

N84-27323# National Aerospace Lab., Amsterdam (Netherlands). Space Div.
HOT SPOT REFLECTANCE MEASUREMENTS APPLIED TO GREEN BIOMASS ESTIMATION AND CROP GROWTH MONITORING
N. J. J. Bunnik, W. Verhoef, R. W. deJongh, H. W. J. vanKasteren (Center for Agrobiological Research, Wageningen, Netherlands), R. H. M. E. Geerts (Center for Agrobiological Research, Wageningen, Netherlands), D. Uenk (Center for Agrobiological Research, Wageningen, Netherlands), and Th. A. deBoer (Center for Agrobiological Research, Wageningen, Netherlands) 4 Apr. 1983 14 p refs Presented at Intern. Colloq. on Spectral Signatures of Objects in Remote Sensing, Bordeaux, Sep. 1983
(NLR-MP-83037-U) Avail: NTIS HC A02/MF A01

A ground-based hot-spot reflectance meter (HSM) was developed and tested for the estimation of green crop biomass and for crop growth monitoring. Calibrated near infrared/red and red/green reflectance ratios which are related to changes of the green leaf area index and the color characteristics of the canopy leaves are acquired. The advantages of the HSM are the independence of solar illumination conditions and the reduced sensitivity to the leaf inclination distribution function. Measurements carried out on winter wheat fields demonstrate good agreement with reflectance model predictions. A significant relation between the near infrared/red ratio and the development of the leaf area index and the corresponding biomass is found. Author (ESA)

N84-27324# National Environmental Satellite Service, Washington, D. C.
FIRE DETECTION USING THE NOAA (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION)-SERIES SATELLITES
Michael Matson, Stanley R. Schneider, Billie Aldridge (National Weather Service), and Barry Satchwell (National Weather Service) Jan. 1984 41 p refs
(PB84-176890; NOAA/TR/NESDIS-7; NOAA-84031901) Avail: NTIS HC A03/MF A01 CSCL 02F

The potential usefulness of thermal infrared sensors onboard NOAA polar orbiting satellites for detecting fires in particular, the 3.8-micrometer channel is sensitive to high temperature sources such as fires. How the 3.8-micrometer channel provides an efficient economical means of detecting and monitoring range, forest, and tundra fires is demonstrated. GRA

N84-26869# Joint Publications Research Service, Arlington, Va.
EVALUATION OF PRECISION OF TRIANGULATION METHOD OF DETERMINING COORDINATES Abstract Only
N. V. Pavlova and Z. V. Kondakova *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 37 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 37 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-27202# Joint Publications Research Service, Arlington, Va.
SOLUTION OF DIRECT PROBLEM IN GRAVIMETRY ON SPHERICAL EARTH Abstract Only
V. I. Starostenko and A. G. Manukin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 34 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 12, Dec. 1983 p 34-49 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27219# Joint Publications Research Service, Arlington, Va.
NEW VARIANT OF EVALUATION OF PREDICTED PETROLEUM AND AS RESERVES ON GENETIC BASIS Abstract Only
A. M. Akramkhodzhayev, A. V. Kirshin, and A. Kh. Nugmanov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 47-48 Transl. into ENGLISH from Uzbek. Geol. Zh. (USSR), no. 5, Sep. - Oct. 1983 p 24-28 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27221# Joint Publications Research Service, Arlington, Va.
ALLOWANCE FOR GEOMAGNETIC FIELD VARIATIONS AND TIE-IN OF OBSERVATIONS IN HIGHLY PRECISE AEROMAGNETIC SURVEYS Abstract Only
V. K. Palamarchuk *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 50 Transl. into ENGLISH from Geol. i Geofiz. (USSR), No. 10, Oct. 1983 p 107-114 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N84-27325 Oregon State Univ., Corvallis.
LINEARIZED MODEL FOR WIND TURBINES IN YAW Ph.D. Thesis
Somsak Chaiyapinunt 1984 222 p
Avail: Univ. Microfilms Order No. DA8407278

The analysis of rigid hut, three bladed horizontal axis, axisymmetric wind turbines in yaw is made using a linearized, four degree of freedom model. The linearized equations of motion of rotor and nacelle are developed using quasi-steady blade element theory and Lagrange's equations. The yaw behavior of the system is studied from coefficients of the equations of motion. Analytical results for two wind turbines are presented and studied. Sensitivity study of the terms in the yaw stiffness coefficient is made. Two FORTRAN computer programs are developed to compute the numerical values of coefficients of the equations of motion.
Dissert. Abstr.

N84-27326 Arizona State Univ., Tempe.
MODELING AND SIMULATION OF LEAD-ACID BATTERIES FOR PHOTOVOLTAIC SYSTEMS Ph.D. Thesis
William Anthony Facinelli 1983 212 p
Avail: Univ. Microfilms Order No. DA8405149

The modeling and simulation of temperature dependence, losses and inefficiencies, hysteresis phenomena, and lifetime during cyclic operation are investigated. The program is used to investigate changes in battery temperature affect PV system operation. The system performance diminishes appreciably if the batteries are not protected from low outdoor temperatures. In the baseline series of simulations the coulombic (ampere hour) efficiency reached nearly 100% and the energy (watt hour) efficiency approached 97%. The actual battery performance lies between the results of simulations using the basic battery model, which ignores hysteresis, and simulation results using a model which overcompensated for hysteresis. A new model for the cumulative wearing of a battery with cycling to varying depths of discharge is presented.
Dissert. Abstr.

N84-27327*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LARGE, HORIZONTAL-AXIS WIND TURBINES Final Report
Bradford S. Linscott, Porter Perkins (Analex Corp.), and Joann T. Dennett (RDD Consultants, Inc.) Mar. 1984 73 p refs
(Contract DE-AI01-76ET-20320)
(NASA-TM-83546; DOE/NASA/20320-58; E-1920; NAS 1.15:83546) Avail: NTIS HC A04/MF A01 CSCL 10B

Development of the technology for safe, reliable, environmentally acceptable large wind turbines that have the potential to generate a significant amount of electricity at costs competitive with conventional electric generating systems are presented. In addition, these large wind turbines must be fully compatible with

electric utility operations and interface requirements. There are several ongoing large wind system development projects and applied research efforts directed toward meeting the technology requirements for utility applications. Detailed information on these projects is provided. The Mod-O research facility and current applied research effort in aerodynamics, structural dynamics and aeroelasticity, composite and hybrid composite materials, and multiple system interaction are described. A chronology of component research and technology development for large, horizontal axis wind turbines is presented. Wind characteristics, wind turbine economics, and the impact of wind turbines on the environment are reported. The need for continued wind turbine research and technology development is explored. Over 40 references are sited and a bibliography is included. Author

N84-27328*# LaQue Center for Corrosion Technology, Inc., Wrightsville Beach, N.C.

CORROSION FATIGUE OF HIGH STRENGTH FASTENER MATERIALS IN SEAWATER Final Report

D. G. Tipton Dec. 1983 27 p refs

(Contract DE-AI01-76ET-20320)

(NASA-CR-174677; DOE/NASA/0337-1; NAS 1.26:174677) Avail: NTIS HC A03/MF A01 CSCL 10B

Environmental effects which significantly reduce the fatigue life of metals are discussed. Corrosion fatigue is a major concern in the engineering application of high strength fasteners in marine environments. The corrosion fatigue failure of an AISI 41L4O high strength steel blade to hub attachment bolt at the MOD-OA 200 kW wind turbine generator was investigated. The reduction of fatigue strength of AISI 41L4O in marine environments and to obtain similar corrosion fatigue data for candidate replacement materials was studied. The AISI 4140, PH 13-8Mo stainless steel, alloy 718 and alloy MP-35N were tested in axial fatigue at a frequency of 20 Hz in dry air and natural seawater. The fatigue data are fitted by regression equations to allow determination of fatigue strength for a given number of cycles to failure. E.A.K.

N84-27329*# Engelhard Minerals and Chemicals Corp., Edison, N. J.

DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEMS Quarterly Report, Feb. - Apr. 1984

A. Kaufman, S. Pudick, C. L. Wang, J. Werth, and J. A. Whelan 31 May 1984 25 p

(Contracts DEN3-241; DE-AI01-80ET-17088)

(NASA-CR-174714; DOE/NASA/0241-13; NAS 1.26:174714; QR-12) Avail: NTIS HC A02/MF A01 CSCL 10B

On-going testing of an 11 cell, 10.7 in. x 14 in. stack (about 1 kW) reached 2600 hours on steady load. Nonmetallic cooling plates and an automated electrolyte replenishment system continued to perform well. A 10 cell, 10.7 in. x 14 in. stack was constructed with a modified electrolyte matrix configuration for the purpose of reducing cell IR loss. The desired effect was achieved, but the general cell performance level was irregular. Evaluation is continuing. Preparations for a long term 25 cell, 13 in. x 23 in. test stack (about 4 kW) approached completion. Start up in early May 1984 is expected. Author

N84-27330# SAFT America, Inc., Cockeysville, Md. Advanced Battery Systems Div.

EVALUATION OF MICA SUBSTITUTES FOR USE IN THERMAL BATTERIES Final Report

S. Dallek, B. F. Larrick, G. Chagnon, and D. Briscoe 1 Sep. 1983 36 p

(Contract N60921-82-M-2277; F61-545)

(AD-A140650; NSWC-TR-83-410) Avail: NTIS HC A03/MF A01 CSCL 10/3

The present work was undertaken to identify and support the development of a substitute for the critical and strategic material phlogopite mica used as electrical insulation in thermal batteries. Candidate materials were evaluated by thermogravimetry and by actual configurational tests in batteries. Author (GRA)

N84-27331# EIC, Inc., Norwood, Mass.

LONG CYCLE LIFE SECONDARY LITHIUM CELLS UTILIZING TETRAHYDROFURAN

K. M. Abraham, J. S. Foos, and J. L. Goldman Apr. 1984 18 p

(Contract N00014-77-C-0155)

(AD-A140762; TR-12) Avail: NTIS HC A02/MF A01 CSCL 10/3

Cycle lifes of secondary Li cells utilizing THF/LiAsF6 solutions have been significantly improved by the use of small amounts of additives such as 2,methyl-furan, 2,methyl-thiophene or similar unsaturated organic compounds. A most important consequence of the discovery has turned out to be the practical utility of the mixed electrolyte, 50 v/o THF:50 v/o 2Me-THF/LiAsF6(1.5M). This solution combined with approx. 3.5 v/o 2Me-furan has enabled 5 A-hr Li/TiS2 cells to exhibit more than 200 cycles at 60% depth-of-discharge. This cycle life is twice that achieved with 2Me-THF/LiAsF6(1.5M). In addition, the mixed electrolyte cells have shown low temperature discharge capabilities superior to those containing either THF/LiAsF6(1.5M) or 2Me-THF/LiAsF6(1.5M). GRA

N84-27332# National Bureau of Standards, Washington, D.C.

MATERIALS RESEARCH ACTIVITIES AT THE NATIONAL BUREAU OF STANDARDS (1975-1982) PERTAINING TO ACTIVE SOLAR HEATING AND COOLING SYSTEMS

C. W. C. Yancey Nov. 1983 75 p refs Sponsored in part by DOE

(PB84-154780; NBSIR-83-2782) Avail: NTIS HC A04/MF A01 CSCL 10A

A summary of the solar energy materials-related research projects conducted by the National Bureau of Standards, for the U.S. Department of Energy, since 1975 is presented. Research studies concerned with materials that are utilized in the collector, transport and storage subsystems are summarized. Materials research areas covered by the documentation include: cover plates, absorber coatings, thermal insulation, sealants, containment materials, heat transfer fluids, hoses and storage media materials. The primary objectives, scope and principal results of the various studies are presented. The relationship between test results and subsequent consensus standard adoption or revision is drawn where applicable. Author (GRA)

N84-27333# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.

SOLAR COLLECTOR TEST PROCEDURES: DEVELOPMENT OF A METHOD TO REFER MEASURED EFFICIENCIES TO STANDARDIZED TEST CONDITIONS Final Report, 1977-1980

W. C. Thomas Feb. 1984 150 p

(Grant NBS-G8-9022)

(PB84-165299; VPI-E-80-E-23; NBS-GCR-84-459) Avail: NTIS HC A07/MF A01 CSCL 10A

An analytical procedure has been developed for referring collector efficiency measurements, obtained under different test conditions, to a common, or standard set of conditions. The procedure applies to flatplate liquid-type collectors of conventional tube-in-sheet design. The basic Hottel-Whillier-Bliss theory is used with appropriate extensions to account for serpentine flow configurations and glazing materials with high infrared transmittance. The procedure includes a systematic method for deriving two invariant collector parameters directly from ASHRAE Standard 93-77 test results. The two parameters selected are the plate absorptance and back loss coefficient. A set of standard conditions is recommended which corresponds to favorable test conditions. Author (GRA)

N84-27334# TRW, Inc., McLean, Va. Energy Engineering Div.

COGENERATION: STATUS AND ENVIRONMENTAL ISSUES Final Report, Jun 1979 - Jul. 1981

J. Dadiani Feb. 1984 81 p refs

(Contract EPA-68-03-2560)

(PB84-155175; EPA-600/7-84-023) Avail: NTIS HC A05/MF A01 CSCL 10B

The purpose of this project was to determine the planned

cogeneration development by the utility and industrial sectors; to assess the environmental impacts and energy savings from cogeneration; and, to identify potential environmental issues and regulations impacting cogeneration development. Major emphasis was placed on environmental impacts. The study investigated the energy savings and environmental impacts of five industrial facilities which are considering a switch to in-plant cogeneration. Potential regional environmental impacts of cogeneration development in New England, the Tennessee Valley Authority service area and northern New Jersey were also determined. Finally, the environmental impacts of a cogeneration-based district heating system were considered. It was found that there are a number of factors which determine the relative magnitude of environmental impacts of a cogeneration system compared to a conventional energy supply system. Author (GRA)

N84-27335 Iowa State Univ. of Science and Technology, Ames.
EFFECT OF RADIAL INFLOW ON VORTEX INTENSIFICATION AND ITS APPLICATION TO WIND VORTEX GENERATORS Ph.D. Thesis
Hiroshi Ide 1982 114 p
Avail: Univ. Microfilms Order No. DA8407082

A wind vortex turbine called a tornado-type wind generator system was studied both theoretically and experimentally to understand the basic nature of a vortex flow and to improve the power efficiencies of the system. Analytical solutions were obtained from the Navier-Stokes equations for the velocity distributions along the radial distance. The result demonstrates the important nature of a vortex structure that, in order to intensify a vortex inside the tower, radial inflow must be provided from the side walls. The contribution of this experimental work was to furnish the radial inflow by utilizing the dynamic head of incoming wind. Extracting wind energy by creating and maintaining an extremely low pressure region of an intensified vortex at the turbine exit through viscous pumping is an improvement for wind machines and consequently is a cost effective procedure. Dissert. Abstr.

N84-26896# Joint Publications Research Service, Arlington, Va.
ECONOMICS OF INSTALLATION OF SOLAR HEATING PLANTS Abstract Only
O. S. Popel, S. Ye. Frid, and E. E. Shpiltayn *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 5 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Energ. i Transp. (Moscow), no. 5, May 1983 p 147-151 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N84-27336# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
STRATOSPHERIC CONCENTRATION OF NITRIC ACID, OZONE AND SULPHUROUS CARBONYL: MEASUREMENT OF NITRIC ACID ABSORPTION IN THE Q BRANCH OF THE v4 BAND AS A FUNCTION OF TEMPERATURE
Sylvie Leboiteux 1982 146 p refs Partly in FRENCH and ENGLISH Report will be announced as ESA-TT-864
(AD-B071596; ONERA-NT-1982-7; ISSN-0078-3781; ESA-TT-864) Avail: NTIS HC A07/MF A01 CSCL 13/2

Ten stratospheric species (O3, No2, OCS, NO, CH4, N2O, HCl, HF, CO, HNO3, and H2O were simultaneously measured and infrared absorption measurements by HNO3 were recorded by instruments on a Caravelle aircraft and from a balloon platform. The spectra obtained are presented and an attempt is made to evaluate a temperature dependence correction for the atmospheric spectra. A.R.H.

N84-27337# Southwest Research Inst., San Antonio, Tex.
REVISION AND EXPERIMENTAL VERIFICATION OF THE HAZARD ASSESSMENT COMPUTER SYSTEM MODELS FOR SPREADING, MOVEMENT, DISSOLUTION, AND DISSIPATION OF INSOLUBLE CHEMICALS SPILLED ONTO WATER, VOLUME 1 Final Report
F. T. Dodge, J. T. Park, J. C. Buckingham, and R. J. Magott Jun. 1983 356 p
(Contract DTCG23-80-C-20026)
(AD-A140635; USCG-D-35-83) Avail: NTIS HC A16/MF A01 CSCL 09/2

Computerized models are developed to predict the spreading, movement, evaporation, and dissolution of floating slicks formed by accidental spills of insoluble chemicals. Separate models are developed for continuous and instantaneous spills. The waterway can be a river, channel, lake, or coastal water. The models emphasize the dynamics of the thick slick (i.e., the gravity-viscous spreading phase) since the thick slick contains nearly all the spilled chemical and represents the most prolonged hazard. Predictions of the spreading models are compared to results of instantaneous and continuous spill tests conducted in a large laboratory basin and a laboratory channel. The evaporation and dissolution predictions are compared to wind tunnel and wind-wave tunnel tests. Agreement of the models and the tests is generally good. GRA

N84-27338# Weston (Roy F.), Inc., West Chester, Pa.
INSTALLATION RESTORATION GENERAL ENVIRONMENTAL TECHNOLOGY DEVELOPMENT. TASK 3: GUIDELINES FOR IN-PLACE CLOSURE OF DRY LAGOONS. VOLUME 2: EVALUATION OF IN-PLACE CLOSURE TECHNOLOGIES Final Report, for Period Ending May 1983
M. F. Coia, S. L. Goitein, A. A. Metry, P. J. Marks, and M. H. Corbin Jan. 1984 337 p 2 Vol.
(Contract DAAK11-82-C-0017)
(AD-A140655; DRXTH-TE-CR-83224) Avail: NTIS HC A15/MF A01 CSCL 13/2

This report presents a review and evaluation of potential in-place closure technologies. The report serves as a user's manual to guide the installation commander through the evaluation of the applicability of in-place closure. Technologies evaluated include soil cap systems, geotextile fabrics, nonsoil caps and liners, surface-water diversion techniques, slurry walls, grout curtains, well points, and biological, chemical, and physical treatment techniques, including desensitization. Author (GRA)

N84-27339# Coastal Engineering Research Center, Vicksburg, Miss.
INTERPRETATIVE ANALYSIS OF SURFICIAL SEDIMENTS AS AN AID IN TRANSPORT STUDIES OF DREDGED MATERIALS CAPE CANAVERAL, FLORIDA Final Report
M. A. Ferland and L. L. Weishar Mar. 1984 30 p
(AD-A140759; CERC-MP-84-3) Avail: NTIS HC A03/MF A01 CSCL 08/3

Analyses of surface and core sediment samples; dredging records; bathymetric surveys; wind, wave, and current data; and pertinent literature were undertaken to determine the amount and direction of sediment transport from a dredge disposal site. The site is located 4.5 miles east of Cocoa Beach, Florida, in 40-55 ft of water, on the inner continental shelf. Dredge disposal material is composed of clay, silt, and fine sand removed from the entrance channel to Port Canaveral Harbor located approximately 7 miles to the north. Volumetric calculations were made using 1983 bathymetric data. Sediment analysis and subsequent plotting of sedimentologic parameters (mean grain size, standard deviation, and skewness) revealed no trends in sediment distribution at the disposal site. Sediment transport studies conducted in the Cape Canaveral region by previous investigators indicate that net movement is alongshore, or approximately north-south. Results of this study suggest that detailed site-specific data are necessary in order to make conclusive statements about sediment transport off the disposal site. GRA

N84-27340# Centre National de la Recherche Scientifique, Orleans (France). Centre de Recherches sur la Chimie de la

Combustion et des Hautes Temperatures.

EXPERIMENTAL AND THEORETICAL STUDY OF NOx BY REDUCTION BY NHI IN GAS PHASE

J. C. Boettner and H. James 1983 7 p refs In FRENCH Presented at Intern. Union of Air Pollution Prevention Assoc. (I.U.A.P.P.A.) 6th World Congr. on Air Quality, Paris, 16-20 May 1983

Avail: NTIS HC A02/MF A01

It is shown that NH2 radicals can be produced by adding NH3 to a CO/O2 reaction at temperatures between 700 and 900 C. The NH2 radicals react mostly with the NO present and provoke a second branch of the mechanism which accelerates NOx destruction. The reaction is advocated as a means of reducing air pollution caused by burning coal and coal tar. Author (ESA)

N84-27341# Institut de Recherche de Transports, Bron (France). Centre d'Evaluation et de Recherches des Nuisances et de l'Energie.

THE LEAD FILE: CAR FUEL ADDITIVES [LE DOSSIER DU PLOMB: ADDITIF DES CARBURANTS AUTOMOBILES]

Robert Joumard, Mireille Chiron, Jean Delsey, and Jacques Lambert Nov. 1983 76 p refs In FRENCH; ENGLISH summary

(Inform-Note-29; ISBN-2-85872-115-8; ISSN-0339-8676) Avail: NTIS HC A05/MF A01

Rate of consumption of and health hazards due to lead additives in gasoline are described. Changes in hemoglobin synthesis and the negative effects on the psychological and intellectual development of children are illustrated. Lead is a poison to catalysts that could be used to control other pollutants. The energy and financial costs of alternatives to lead are analyzed, concluding that a lead-free 91 octane gasoline could be the answer, if engine technology developments are adopted.

Author (ESA)

N84-27342# Technische Hogeschool, Delft (Netherlands). Luchtvaarten Ruimtevaarttechniek

AIRFIELD NOISE EVALUATION PROGRAM (ANEP)

F. W. J. vanDeventer Dec. 1982 90 p refs In DUTCH

(VTH-LR-370) Avail: NTIS HC A05/MF A01

The Airfield Noise Evaluation program (ANEP) for the determination of noise contours around airfields for small aircraft is presented. The ANEP consists of six computer programs, each analyzing a part of the noise load. The structure of ANEP and the sequence of the programs are explained. The possibilities and weaknesses of the program are given. A users guide is presented. The different computer programs are enclosed.

Author (ESA)

N84-27343# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

FLIGHT TRACK AND AIRCRAFT NOISE MONITORING SYSTEM (FANAMOS)

T. H. M. Hagenberg and H. J. P. Scholten 11 Jul. 1983 23 p Presented at Europaische Vereinigung Fluglaermschutzbeauftragter, Schiphol, Netherlands, 16 Sep. 1983

(NLR-MP-83043-U) Avail: NTIS HC A02/MF A01

The Flight track and Aircraft Noise Monitoring System FANOMOS, that automatically monitors the flight tracks of departing and arriving aircraft is described. The actual flight tracks are continuously compared with the prescribed flight tracks, and recorded for later use. With FANOMOS, air traffic authorities can promptly inform aircraft operators in case of significant deviations from the designated standard procedures. The FANOMOS can be installed at any major airport, provided that digitized radar information (from a terminal approach radar) and digitized flight plan information are available. The FANOMOS processes this information to yield an accurate flight path of any SSR-transponder-equipped aircraft. Author (ESA)

N84-27344# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 1: Physics.

PROJECT NOORWIDJ. PART 4: THE RADAR BACKSCATTER OF OIL SPILLS AS MEASURED AT PLATFORM NOORDWIJK

G. P. deLoor Nov. 1983 18 p refs

(PhL-1983-47; TDCK-78759) Avail: NTIS HC A02/MF A01

Measurements of the radar backscatter of oil spills, made at the offshore platform Noordwijk in the years 1978 and 1979, are reported (X-band). The data set is small therefore comparisons were made with literature data. The data obtained for the contrast fit the more general picture which suggests an angle of maximum contrast. The autocorrelation functions show that the reduction in reflection is due to the reduced influence of the capillaries and short gravity waves in resonance with the radar waves.

Author (ESA)

N84-27345# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Audiology Group.

ANNOYANCE RATINGS FOR IMPULSE AND TRAFFIC SOUNDS AT TWO DIFFERENT BACKGROUND NOISE LEVELS

J. Vols and G. F. Smoorenburg Dec. 1983 28 p refs

(IZF-1983-27; TDCK-78819) Avail: NTIS HC A03/MF A01

In the laboratory, 4 groups of 16 subjects rated the annoyance caused by 3 types of impulse sounds (regular and irregular gunfire noise and metal construction noise) and by traffic sounds, all presented in background noise. Results show that for lower levels of the sounds, an impulse noise correction of at least 10 dB is required, whereas for higher levels the derived correction is equal to the ISO/R 1996 penalty of 5 dB. This conclusion, based on the relation between Leq and annoyance ratings, is consistent with the correction based on Leq and the percentage of subjects who reported to be very much annoyed. For equivalent levels of the impulse sounds at which 33% of the subjects claimed to be very much annoyed, the correction is 10 or 5 dB, depending on whether the indoor Leq of the background noise was 35 of 55 dB(A). With this criterion of 33%, source-specific and total annoyance yield the same penalty for impulse noise. Author (ESA)

N84-27346# Iowa Dept. of Water, Air and Waste Management, Des Moines. Program Development Div.

AIR QUALITY REPORT, 1982 Annual Report

Dec. 1983 88 p refs

(PB84-166750; AR-10) Avail: NTIS HC A05/MF A01 CSCL 13B

Iowa's air monitoring data from 1957 to 1982 were compiled for seven pollutants monitored in the State: suspended particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, nonmethane hydrocarbons, ozone and lead. The data are presented in tabular form of each pollutant. The pollutants and pollutant sources, the air monitoring network, and the analysis of data and trends are discussed. GRA

N84-27347# California State Dept. of Water Resources, Sacramento. Office of Water Research and Technology.

AGRICULTURAL WASTE WATER REVERSE OSMOSIS PRETREATMENT

Carl Hild, Roger Lindholm, Donat Brice, and Gerhard Klein (California Univ., Berkeley) Jun. 1983 80 p refs

(Contract DI-14-34-0001-0529; OWRT Proj. C-00211-R)

(PB84-153543; OWRT-C-00211-R(0529)(1)) Avail: NTIS HC A05/MF A01 CSCL 02C

Investigations were made to demonstrate that an ion-exchange (IX) softening system regenerated with reverse-osmosis (RO) reject brine can be operated successfully on a sustained basis to provide softened feed water for an RO system used to desalt brackish water. Various combinations of operating conditions were evaluated to determine sustainable conditions that would produce the largest quantity of softened water per unit of regenerant used. During the investigations, two transparent plastic IX columns were operated alternately in softening and regeneration modes. The IX-RO system was operated in an automated mode to demonstrate that the system could be operated without frequency attention. Results suggest that an IX system regenerated with RO reject brine can be operated successfully to provide softening feed water for the RO system. The pilot plant operating under optimum conditions produced 1.4 gallons of softened water per gallon of

regenerant used. The IX-RO system can be automated.
Author (GRA)

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N84-27348 Maryland Univ., College Park.
THE INFLUENCE OF LOCALIZED PRECIPATION-INDUCED D-REGION IONIZATION ENHANCEMENTS ON SUBIONOSPHERIC VLF PROGATION Ph.D. Thesis
Alexandra Tolstoy 1983 258 p
Avail: Univ. Microfilms Order No. DA8405713

Short-term nighttime perturbations of the phase and amplitude of very low frequency radio wave transmissions propagating in the Earth-ionosphere waveguide are observed to correlate with the coincident occurrence of magnetospheric whistler/noise emissions. These signal perturbations are believed to be caused by the whistler/noise induced precipitation of energetic electrons into the ionospheric D region. The location and extent of these precipitation regions as may be deduced by model predictions of subionospheric radio wave propaation were investigated. A two-dimensional propagation model was used extensively to examine the effects of various configurations of localized ionospheric perturbations on the VLF radio waves. The mathematical foundation of the model is discussed extensively and is shown to be related to the ideas of invariant embedding. Calculations show that to obtain the very large amplitude increases observed in the signal data, two regions of localized D region ionization enhancement, one near the transmitter and one near the receiver, must exist simultaneously. Dissert. Abstr.

N84-27349 Iowa Univ., Iowa City.
WHISTLER MODE TURBULENCE AT EARTH'S BOW SHOCK: GENERATION VIA ELECTRON BEAMS AND RAY PATH INTEGRATED AMPLIFICATION Ph.D. Thesis
Robert Louis Tokar 1983 119 p
Avail: Univ. Microfilms Order No. DA8407793

The Landau and cyclotron growth rates of whistler mode instabilities in the transition region of Earth's bow shock were calculated. Three electron distribution functions measured by the fast plasma experiment on ISEE 2 and a model distribution that is a function of penetration into the shock were used in the calculation. An important feature of these electron distribution functions is the presence of a field-aligned beam. The beam velocity vector is directed toward the magnetosheath. The calculations show that the distributions spontaneously generate whistler mode waves with electromagnetic Landau resonance and/or cyclotron resonance contributing to wave growth. Ray paths and path-integrated growth rates for the waves were calculated using a planar bow shock model. Results of the study provide an explanation for the origin of much of the whistler mode turbulence observed at the bow shock. Dissert. Abstr.

N84-27350# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
BASIC ELEMENTS OF NUCLEAR GEOPHYSICS [ELEMENTOS BASICOS DE GEOFISICA NUCLEAR]
Daniel J. R. Nordemann and Enio B. Pereira Feb. 1984 31 p refs In PORTUGUESE; ENGLISH summary
(INPE-3002-PRE/452) Avail: NTIS HC A03/MF A01

Nuclear geophysics applies the nuclear radiation detection methodology to the geosciences, especially the dynamic processes of the lithosphere, the hydrosphere and the atmosphere as well as some aspects of planetology and astrophysics. The main methods described include: alpha and gamma ray spectrometry, the interaction of alpha and gamma radiation with matter and the detectors used (grid chambers, surface barrier silicon detector for alpha radiation; and sodium iodide thallium activated phosphors, hyperpure and lithium drifted germanium semiconductor detectors for gamma radiation). The principle applications of nuclear geophysics are given as examples to illustrate the use of the methods described. Author

N84-27351# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A REPORT ON THE TASK OF COLLECTING GEOLOGICAL AND STRUCTURAL DATA IN RIO DE JANEIRO STATE [RELATORIO DE TRABALHO DE COLETA DE DADOS GEOLOGICOS E ESTRUTURAIS NO ESTADO DO RIO DE JANEIRO]
Liu Chan Chiang and Jose Eduardo Rodrigues Aug. 1983 158 p In PORTUGUESE; ENGLISH summary
(INPE-2851-NTE/203) Avail: NTIS HC A08/MF A01

The geological structure of 13 profiles of Rio de Janeiro State are described. Structural data useful to the study of the tectonics are examined. Almost 7000 points, faults and foliations were measured, mainly in the rocks of the two principal stratigraphic units in the state: Paraiba and Serra dos Orgaos Groups. E.A.K.

N84-27352# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FIELD STUDIES IN THE STRUCTURAL SOCIETY PROJECT: MINERALIZED LINEAMENTS [TRABALHO DE CAMPO NA AREA DO PROJETO ASSOCIACAO ESTRUTURAL: LINEAMENTOS-MINERALIZACAO]
Celio Eustaquio dosAnjos, Milton Garcia Balieiro, Athos Ribeiro dosSantos, and Paulo Veneziani Sep. 1983 95 p In PORTUGUESE; ENGLISH summary
(INPE-2876-NTE/205) Avail: NTIS HC A05/MF A01

Geological and geomorphological data derived from preliminary observations during the months of November and December, 1982, in the southeastern portion of the state of Santa Catarina are described. The goal of the work was the collection of field data for the Projeto Associacao Estrutural. Several roadside traverse surveys were carried out to map parana Basin sedimentary and basement rocks and their structures (fractures and faults). Author

N84-27353*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A COMPARATIVE REVIEW OF BOW SHOCKS AND MAGNETOPAUSES
Ronald P. Lepping Apr. 1984 56 p refs
(NASA-TM-86114; NAS 1.15:86114) Avail: NTIS HC A04/MF A01 CSCL 04A

Bow shock and magnetopauses formation is discussed. Plasma and magnetic field environments of all the planets from Mercury to Saturn were measured. It was found that all the planets have bow shocks and almost all have a magnetopause. Venus is the only planet with no measurable intrinsic magnetic field and the solar wind interacts directly with Venus' ionosphere. The bow shock characteristics depend on the changing solar wind conditions. The shape of a magnetopause or any obstacle to flow depends on the three dimensional pressure profile that it presents to the solar wind. Jupiter is unusual because of the considerable amount of plasma which is contained in its magnetosphere. Magnetopause boundaries in ecliptic plane projection are modelled by segments of ellipses, matched to straight lines for the magnetotool boundaries or parabolas. Specific properties of known planetary bow shocks and magnetopauses are reviewed. E.A.K.

N84-27354*# Ohio State Univ., Columbus. Dept. of Physics.
SIMULTANEOUS RETRIEVAL OF ATMOSPHERIC TEMPERATURES AND RAY PATHS FROM OCCULTATION SPECTRA
Michael L. Hoke and John H. Shaw [1983] 17 p refs
(Grant NsG-7469)
(NASA-CR-173649; NAS 1.26:173649) Avail: NTIS HC A02/MF A01 CSCL 04A

Simulated equivalent width data of weak lines in solar occultation spectra were analyzed to retrieve both the solar atmospheric temperature profile and the tangent heights of the rays. It was assumed that the mixing ratio of the absorbing gas was known,

but it is not necessary to know the satellite height. By analyzing lines with temperature dependent and temperature independent intensities, temperatures accurate to 1 K and tangent heights to 0.25 km were determined over the range 20 to 90 km. R.S.F.

N84-27355# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
A EUROPEAN ASTRO-GRAVIMETRIC GEOID
1983 120 p refs
(SER-B-269; Mitt-169; ISSN-0071-9196) Avail: NTIS HC A06/MF A01

A European geoid was computed by combining a high resolution gravimetric geoid with astrogeodetic vertical deflections. Adjustment methods were used to combine deflection and gravity data. For individual titles, see N84-27356 through N84-27357.

N84-27356# Technische Univ., Hanover (West Germany). Inst. fuer Erdmessung und Sonderforschungsbereich 149.
COMPUTATION OF A HIGH RESOLUTION EUROPEAN GRAVIMETRIC GEOID (EGG 1)
W. Torge, G. Weber, and H.-G. Wenzel *In* Inst. fuer Angewandte Geodaesie A European Astro-Gravimetric Geoid 1983 p 7-30 refs Sponsored by Deutsche Forschungsgemeinschaft (For primary document see N84-27355 17-46)
Avail: NTIS HC A06/MF A01

A European geoid was computed by combining a high resolution gravimetric geoid with astrogeodetic vertical deflections. The computed quantities represent the disturbing potential T in form of quasi-geoidal undulations zeta p = Tp/gamma p (gamma p = normal gravity), which are the height anomalies at the surface of the Earth. This is in full agreement with the representation of geopotential Numbers C as the result of the geometric leveling by a derived metric quantity, the normal heights. Author (ESA)

N84-27357# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
THE COMPUTATION OF AN ASTROGRAVIMETRIC GEOID BY ADJUSTMENT
Juergen Brennecke, Dieter Leigemann, and Ewald Reinhart *In its* A European Astro-Gravimetric Geoid 1983 p 31-115 refs (For primary document see N84-27355 17-46)
Avail: NTIS HC A06/MF A01

The geoid in central and southern Europe and the Mediterranean area was computed from a set of deflections of the vertical. Because of the irregular data distribution, deflection information was combined with gravity data. Long wavelength features of the geoid can be computed twice from the heterogeneous data, so the residuals of an adjustment reveal systematic errors in the data. The functional and stochastic adjustment models for the approximation of the disturbing potential and geoidal undulations are outlined. The screening procedure reveals systematic discrepancies between gravimetric and astrogeodetic information. Author (ESA)

N84-27358*# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
LOW FREQUENCY ELECTRIC AND MAGNETIC NOISE ALONG THE AURORAL FIELD LINES Progress Report
D. A. Gurnett, R. L. Huff, J. D. Menietti, J. D. Winingham, and J. L. Burch Feb. 1984 56 p Prepared in cooperation with Southwest Research Institute, San Antonio, TX
(Contracts NAS5-26363; NAS5-25693; Grant NAG5-310; Contract N00014-76-C-0016)
(NASA-CR-173641; NAS 1.26:173641; AD-A140586; U-OF-IOWA-84-2) Avail: NTIS HC A04/MF A01 CSCL 04A

Plasma wave and plasma measurements from the DE-1 spacecraft are used to investigate an intense band of low frequency, < 100 Hz, electric and magnetic noise detected at low altitudes over the auroral zones. This noise is observed by DE-1 on essentially every low altitude pass over the auroral zone and occurs in regions of intense low energy, 100 eV to 10 keV, electron precipitation and field-aligned currents. The electric field polarization in a plane perpendicular to the static magnetic field is random. Correlation measurements between the electric and magnetic fields show that the perpendicular (approx. north-south) electric field fluctuations are closely correlated with the perpendicular (east-west) magnetic field fluctuations, and that the Poynting flux is directed downward, toward the Earth. The total electromagnetic power flow associated with these fluctuations is very large, approx. 10 to the 8th power watts. Two interpretations of the low frequency noise are considered: first, that the noise is produced by quasi-static fields imbedded in the ionosphere, and second, that the noise is due to Alfven waves propagating along the auroral field lines. For the quasi-static interpretation, the ratio of the magnetic to electric field strengths is determined by the Pedersen conductivity at the base of the ionosphere, whereas for the Alfven wave interpretation it is determined by the Alfven index of refraction. GRA

N84-27359# Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
EFFECTS OF LATERAL HETEROGENEITIES ON THE PROPAGATION, SCATTERING, AND ATTENUATION OF THE SEISMIC WAVES AND THE CHARACTERIZATION OF THE SEISMIC SOURCE Ph.D. Thesis Final Technical Report, 1 Dec. 1981 - 30 Sep. 1983
K. Aki and M. N. Toksoz 30 Sep. 1983 250 p
(Contract F49620-82-K-0004; ARPA Order 4397; AF Proj. 2D60)
(AD-A140595; AFOSR-84-0260TR) Avail: NTIS HC A11/MF A01 CSCL 08/11

The work illustrates results obtained in a broad set of applications of a technique of inverting body and surface waveform data for source mechanism and depth. The applications employ a forward model of the P waveform that includes the effects of source radiation pattern described by the zeroth order moment tensor, the effects of several near source and receiver reflections and conversions, and a teleseismic attenuation operator. This general source model has been used by many investigators during the last decade. The original contributions of the present study include investigation tradeoffs in source parameters, optimal parameterizations for extended earthquake sources, improvements in the resolution of parameters through the use of broad band data obtained from digitally recorded records, and illustration of the value of including S waves in the inversion of explosion sources, an illustrations that demonstrate that the body waveforms at some stations cannot be explained by a model of simple propagation in a radially symmetric Earth. Inversions of broad band data improve the resolution of source depth, important for source discrimination, and the inclusion of S data generally reduces the non-isotropic components of the moment tensor of an explosion that would be obtained from an inversion using only P waves. Amplitude variations of P waves at some seismic stations cannot be simply explained by variations in path attenuation and indicate that multipathing and focusing and defocusing by three-dimensional structure can be important at specific sites. GRA

N84-27360# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
DISTRIBUTIONS OF AURORA AND IONOSPHERIC CURRENTS OBSERVED SIMULTANEOUSLY ON A GLOBAL SCALE
J. D. Craven, Y. Kamide, L. A. Frank, S. I. Akasofu, and M. Sugiura Aug. 1983 36 p
(Contract N00014-76-C-0016)
(AD-A140615; U-OF-IOWA-83-26) Avail: NTIS HC A03/MF A01 CSCL 04/1

The instantaneous spatial distribution of auroral emissions is observed with auroral imaging photometers on board the spacecraft Dynamics Explorer 1 (DE 1) as ground-based meridian chains of magnetometers simultaneously detect the magnetic signatures of ionospheric and field-aligned currents flowing at northern polar latitudes. Ionospheric conductivities at nighttime auroral latitudes are estimated from the measured auroral luminosities and used with the measured polar magnetic variations to compute model distributions of ionospheric and field-aligned currents. Temporal resolution for the coordinated observations and model calculations is 12 minutes. Model ionospheric and field-aligned current distributions are overlayed on global auroral images to illustrate spatial

relations on a global scale at the maximum epoch of an auroral substorm. Eccentric-dipole-latitude and magnetic-local-time coordinates are used. A model field-aligned current distribution is compared quantitatively with the distribution of field-aligned currents inferred from simultaneous observations by the DE-2 magnetometer. Author (GRA)

N84-27361# Cork Geotechnics Ltd., Castlemartyr (Ireland).
PROCEDURES FOR DEALING WITH SEISMICALLY INDUCED SETTLEMENTS Periodic Report, 20 Mar. - 7 Apr. 1984
W. D. L. Finn Apr. 1984 7 p
(Contract DAJA45-84-C-0021; DA Proj. 1T1-61102-BH-57)
(AD-A140775; PR-1) Avail: NTIS HC A02/MF A01 CSCL 13/13

Plans for a series of 7 centrifuge tests have been developed which define model geometry, materials and instrumentation. Four basic model designs adopted include dry and saturated embankments with and without surcharge loading. GRA

N84-27362*# Iowa Univ., Iowa City.
GENERATION OF BROADBAND ELECTROSTATIC NOISE BY ION BEAM INSTABILITIES IN THE MAGNETOTAIL Progress Report
C. L. Grabbe and T. E. Eastman Jun. 1983 51 p
(Contracts NAS5-26819; NAS5-26257; Grants NAGw-364; NGL-16-001-043; Contract N00014-76-C-0016)
(NASA-CR-173643; NAS 1.26:173643; AD-A140809; U-Of-Iowa-83-28) Avail: NTIS HC A04/MF A01 CSCL 04A

Particle data from ISEE-1 sampled in the Earth's magnetotail show the presence of energetic ion beams in the boundary layer of the plasma sheet. A theory of instabilities driven by the beams is developed and compared with wave data sampled simultaneous to the particle data. We concluded that the ion beams generate broadband electrostatic bursts of noise. The electrostatic noise correlates well with the occurrence of the beams, and the spectrum is consistent with that predicted from a negative energy beam instability under magnetotail conditions. The theory predicts that a spectrum of growing waves can be driven for frequencies from .001 omega pe up to omega pe, the electron plasma frequency, with a spectral peak typically under .01 omega pe or lower, in agreement with the wave data. Furthermore, as one moves away from the source region perpendicular to the magnetic field, the high frequency components of the observed wave spectra are predicted to gradually disappear, leaving the low frequency part of the spectrum, also as is observed. Evidence is given for significant pitch-angle scattering of the beams by the broadband electrostatic noise leading to more isotropic ion distributions.
Author (GRA)

N84-27363# Technische Univ., Graz (Austria). Inst. fuer Weltraumforschung.
PLASMA PROCESSES CAUSED BY AN ELECTRON BEAM INJECTED FROM A HIGH ALTITUDE ROCKET PROBE. PART 1: NEUTRALIZATION PROCESSES
G. G. Managadze (Academy of Sciences, Moscow), T. I. Gagua (Academy of Sciences, Moscow), S. B. Lyakhov (Academy of Sciences, Moscow), A. D. Mayorov (Academy of Sciences, Moscow), A. A. Martinson (Academy of Sciences, Moscow), W. K. Reidler, M. F. Friedrich, N. A. Leonov (Kiev University), Z. Klos (Academy of Sciences, Warsaw), and A. N. Laliashvili (Academy of Sciences, Tbilisi, USSR) May 1983 37 p refs Sponsored by Austrian Federal Ministry of Science and Research
(IWF-8302) Avail: NTIS HC A03/MF A01

Electrons were injected between 80 and 1514 km from a rocket in order to study neutralization processes in ionospheric and magnetospheric plasma. Payload potential, its spatial distribution and current-voltage characteristics were measured. The altitude dependence of these quantities is presented. The current and energy distribution of electrons neutralizing the payload charge were measured and optical and radio emissions were observed during beam injection. It is shown that below 130 km complete charge neutralization is achieved. Between 150 and 450 km the value of the payload potential is close to the gun voltage. Above 450 km anomalously high payload potentials are measured during pulses. Author (ESA)

N84-27364# Technische Univ., Graz (Austria). Inst. fuer Weltraumforschung.
PLASMA PROCESSES CAUSED BY AN ELECTRON BEAM INJECTED FROM A HIGH ALTITUDE ROCKET PROBE. PART 2: STUDIES OF BEAM-PLASMA DISCHARGE
G. G. Managadze (Academy of Sciences, Moscow), S. B. Lyakhov (Academy of Sciences, Moscow), B. M. Balebanov (Academy of Sciences, Moscow), T. I. Gagua (Academy of Sciences, Moscow), A. A. Martinson (Academy of Sciences, Moscow), A. D. Mayorov (Academy of Sciences), M. F. Friedrich, W. K. Riedler, Z. Klos (Academy of Sciences, Warsaw), A. N. Laliashvili (Academy of Sciences, Tbilisi, USSR) et al May 1983 32 p refs Sponsored by Oesterreichische Akademie der Wissenschaften
(IWF-8303) Avail: NTIS HC A03/MF A01

Electron beam interaction with a high altitude rocket payload was studied. The spectral distribution and intensity of the HF-field, glow intensity in the visible range, and the flux and distribution of electrons were used to identify beam-plasma discharge (BPD). In the initial phase of the experiment, local BPD is detected during beam-electron interaction with the intrinsic atmosphere of the payload (outgassing). Critical injection currents for BPD occurrence and a hysteresis effect of BPD are established. During the downleg, BPD formation in the natural atmosphere extends 100 m, decreasing during the payload's descent. The BPD effect on the neutralization of the rocket potential, formed during the injection, is discussed. Author (ESA)

N84-27365# Technische Univ., Graz (Austria). Inst. fuer Weltraumforschung.
MEASUREMENT OF NITRIC OXIDE IN THE EQUATORIAL D-REGION AND OTHER RELEVANT PARAMETERS
K. M. Torkar, D. Beran (DFVLR, Wessling, West Germany), M. F. Friedrich, B. H. Subbaraya (Physical Research Laboratory, Ahmedabad, India), Shyam Lal (Physical Research Laboratory, Ahmedabad, India), and A. Jayaraman (Physical Research Laboratory, Ahmedabad, India) Aug. 1983 36 p refs Presented at 28th IUGG Assembly, Hamburg, Aug. 1983 Sponsored by Oesterreichische Akademie der Wissenschaften
(IWF-8304) Avail: NTIS HC A03/MF A01

A sounding rocket launched shortly after sunrise measured equatorial D region concentration of nitric oxide, total ion density, ozone and Lyman-alpha flux. All parameters important for the formation of the daytime D-region are available except X-rays.
Author (ESA)

N84-27366# Stockholm Univ. (Sweden). Dept. of Meteorology.
ATMOSPHERIC SELENIUM
Howard B. Ross 1 Mar. 1984 72 p refs Sponsored by National Swedish Environment Protection Board
(CM-66; ISSN-0280-445X) Avail: NTIS HC A04/MF A01

Using a mass balance approach, an atmospheric selenium budget for the region 30N to 90N was constructed. To calculate sinks of atmospheric selenium, the atmosphere was divided into aerosol burdens corresponding to mean selenium aerosol concentrations in urban, intermediate (rural), remote/continental, and oceanic air. The residence for atmospheric selenium between 30N and 90N is around 1 to 4 days. Budget calculations indicate that nearly all atmospheric selenium originates from anthropogenic emissions and biological activity in terrestrial and marine ecosystems. Author (ESA)

N84-27367# Uppsala Ionospheric Observatory (Sweden).
[IONOSPHERIC OBSERVATION ACTIVITIES REPORT] Annual Report, 1983
1984 52 p refs Sponsored by Swedish Board for Space Activities, Swedish Natural Science Research Council and Research Inst. of National Defence
(UIO-SR-84-01; ISSN-0349-2702) Avail: NTIS HC A04/MF A01

Space plasma physics research, particularly high latitude ionospheric phenomena and phenomena related to the interaction

of the ionosphere with the magnetosphere and with the neutral atmosphere is summarized. Experiments using sounding rockets, the Viking satellite, EISCAT, backscatter radars, and equipment for observing stimulated electromagnetic emissions from heating experiments are described. Routine monitoring of ionospheric conditions by ionosonde, riometer, and backscatter radar techniques is outlined. Author (ESA)

N84-27368# National Academy of Sciences - National Research Council, Washington, D. C. Commission on Physical Sciences, Mathematics and Resources.
CAUSES AND EFFECTS OF CHANGES IN STRATOSPHERIC OZONE: UPDATE 1983 Final Report
Feb. 1984 262 p refs Sponsored in part by EPA
(PB84-176072; ISBN-0-309-03443-4; LC-84-60100) Avail: NTIS HC A12/MF A01 CSCL 06E

Current understanding of man made causes of changes in stratospheric ozone includes releases of chlorofluorocarbons (CFCs), nitrous oxide, nitrogen oxides, methane, carbon dioxide, and other trace gases. Results of models are up to date. The biological consequences of changes in stratospheric ozone focusing on effects of increased exposure to solar ultraviolet B radiation would accompany decreases in ozone. GRA

N84-27369# Junta de Energia Nuclear, Madrid (Spain). Div. de Quimica Analftica.
VOLATILIZATION-EXCITATION PHENOMENA AND EFFICIENCY OF SPECTROCHEMICAL BUFFERS IN THE ANALYSIS OF GEOLOGICAL SAMPLES. 1: THE ACTION OF THE MIXTURE LI2CO3 GRAPHITE
J. P. I. Diaz-Guerra and M. Roca 1984 51 p refs In SPANISH; ENGLISH summary
(JEN-555; ISSN-0081-3397) Avail: NTIS HC A04/MF A01

The volatilization-excitation mechanisms of Li2CO3, SrCO3, and GeO2 as buffers for the determination of different major constituents in geological samples was investigated in electrode, anodic and are plasmas. The evaluation of fundamental parameters and processes in d.c. arc which were applied to a Li2CO3:graphite(1:1) mixture are examined. The action of each of the other species are also discussed. Intensity time curves, variation of voltage between the electrodes, reaction products formation, vapor diffusion through the electrode wall, load depletion, temperature, electron pressure, and ionization in the arc plasma were studied. The measurement of plasma parameters was performed by introducing thermometric and manometric species in both the anode and cathode electrodes. B.G.

N84-27079*# Boston Coll., Chestnut Hill, Mass. Dept. of Physics.
MST RADAR DETECTION OF MIDDLE ATMOSPHERE TIDES
J. M. Forbes *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 22-29 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-81-13078)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27080*# Colorado Univ., Boulder. Cooperative Inst. for Research in Environmental Science.
METEOROLOGICAL AND DYNAMICAL REQUIREMENTS FOR MST RADAR NETWORKS: WAVES
S. K. Avery *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 30-33 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27081*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
RADAR OBSERVATIONS OF INERTIAL PERIOD WAVES IN THE LOWER STRATOSPHERE OVER ARECIBO Abstract Only
C. R. Cornish and M. F. Larsen *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 34 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27082*# Illinois Univ., Urbana. Dept. of Atmospheric Sciences.
BAROCLINIC INSTABILITY IN THE STRATOSPHERE AND MESOSPHERE Abstract Only
K.-S. Zhang and T. Sasamori *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 35 Submitted for publication (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27083*# Instituto Geofisico del Peru, Lima.
EQUATORIAL MST RADARS: FURTHER CONSIDERATION
P. Lagos *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 36-39 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27102*# National Oceanic and Atmospheric Administration, Boulder, Colo.
SOLAR CONTROL OF WINTER MESOSPHERIC ECHO OCCURRENCE AT POKER FLAT, ALASKA Abstract Only
W. L. Ecklund and B. B. Balsley *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 145-146 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27115*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TECHNIQUES FOR STUDYING GRAVITY WAVES AND TURBULENCE
M. A. Geller *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 241-246 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 08E

N84-27116*# National Oceanic and Atmospheric Administration, Boulder, Colo. Center for Research in the Environmental Sciences.
TECHNIQUES FOR STUDYING GRAVITY WAVES AND TURBULENCE: HORIZONTAL, VERTICAL AND TEMPORAL RESOLUTION NEEDED
S. K. Avery and D. A. Carter (NOAA, Boulder, Colo.) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 247-249 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27117*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
THE MST RADAR TECHNIQUE: A TOOL FOR INVESTIGATIONS OF TURBULENCE SPECTRA
M. F. Larsen *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 250-255 refs (For primary document see N84-27076 17-42)
(Grants NAGw-362; NSF ATM-81-08381)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27118*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
EXISTENCE OF A PERSISTENT BACKGROUND OF TURBULENCE
T. E. VanZandt *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27119*# EISCAT Scientific Association, Kiruna (Sweden).
DETERMINATION OF VERTICAL AND HORIZONTAL WAVELENGTHS OF GRAVITY WAVES
J. Rottger *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 262-268 ref (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27120*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
TECHNIQUES FOR STUDYING GRAVITY WAVES AND TURBULENCE: VERTICAL WIND SPEED POWER SPECTRA FROM THE TROPOSPHERE AND STRATOSPHERE OBTAINED UNDER LIGHT WIND CONDITIONS Abstract Only
W. L. Ecklund, B. B. Balsley, M. Crochet (Lab. de Sondages Electromagnetiques de l'Environment Terrestre), D. A. Carter, A. C. Riddle, and R. Garello *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 269 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27122*# Utah State Univ., Logan. Center for Atmospheric and Space Sciences.
EVIDENCE FOR PARALLEL ELONGATED STRUCTURES IN THE MESOSPHERE
G. W. Adams, J. W. Brosnahan (Tycho Technology, Inc., Boulder, Colo.), and D. C. Walden (NOAA, Boulder, Colo.) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 274-279 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-81-17275)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27125*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE RELATIONSHIP BETWEEN STRENGTH OF TURBULENCE AND BACKSCATTERING RADAR POWER AT HF AND VHF
W. K. Hocking *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 289-301 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27126*# EISCAT Scientific Association, Kiruna (Sweden).
RELATIONSHIP OF STRENGTH OF TURBULENCE TO RECEIVED POWER
J. Rottger *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 302-303 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27127*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ON THE EXTRACTION OF ATMOSPHERIC TURBULENCE PARAMETERS FROM RADAR BACKSCATTER DOPPLER SPECTRA. PART 1: THEORY Abstract Only
W. K. Hocking *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 304 Previously announced as 83A-29427 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27128*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
MESOPHERIC TURBULENCE INTENSITIES MEASURED WITH A HF RADAR AT 35 DEG S. PART 2 Abstract Only
W. K. Hocking *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 304 (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27137*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
STRATOSPHERE AND TROPOSPHERE (S-T) STUDIES AT MILLSTONE HILL. RECENT RESULTS, CAPABILITIES AND LIMITATIONS
P. K. Rastogi *In* Intern. Council Sci. Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 357-368 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27180# Joint Publications Research Service, Arlington, Va.
PRESENT-DAY STATUS OF INVESTIGATIONS OF ANTHROPOGENIC INFLUENCE ON ATMOSPHERIC OZONE Abstract Only
K. Ya. Kondratyev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 6 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1235-1251 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27184# Joint Publications Research Service, Arlington, Va.
RADIATIVE HEAT EXCHANGE IN ATMOSPHERE DISTURBED BY VOLCANIC ERUPTION Abstract Only
K. Ya. Kondratyev and N. I. Moskalenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 9-10 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 4, Feb. 1984 p 799-801 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27185# Joint Publications Research Service, Arlington, Va.
SELF-SIMILAR REGIMES OF NONSTATIONARY TURBULENT CONVECTION Abstract Only
A. Yu. Benilov and M. Kh. Rozovskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 15 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 944-949 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27190# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF WIND ON RATE OF GAS EXCHANGE THROUGH OCEAN-ATMOSPHERE INTERFACE Abstract Only
F. G. Batrakov, V. N. Yeremeyev, and A. D. Zemlyanoy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 19-20 Transl. into ENGLISH from Dokl. Akad. Nauk Ukr. SSR, Ser. B: Geol., Khim. i Biol. Nauki (Kiev), no. 1, Jan. 1984 p 3-6 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27191# Joint Publications Research Service, Arlington, Va.
FLUCTUATION OF VELOCITY DISTRIBUTION UNDER INFLUENCE OF SUSPENDED PARTICLES ON TURBULENCE IN BOTTOM CURRENT Abstract Only
V. I. Samolyubov, S. V. Galkin, and A. A. Zelenov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 21 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1188-1197 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27199# Joint Publications Research Service, Arlington, Va.
MAGNETOHYDRODYNAMIC GENERATOR HELPS PREDICT EARTHQUAKES Abstract Only
In its USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 29 Transl. into ENGLISH from Sov. Kirgiziya (USSR), 3 Mar. 1984 p 4 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27200# Joint Publications Research Service, Arlington, Va.
DESCRIPTIVE STATISTICAL MODEL OF EARTHQUAKE FOCAL RADIATION AND ITS APPLICATION IN EVALUATING SHORT-PERIOD STRONG MOVEMENT Abstract Only
A. A. Gusev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 32 Transl. into ENGLISH from Vulkanol. i Seysmologiya (Moscow), no. 1, Jan. - Feb. 1984 p 3-22 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27201# Joint Publications Research Service, Arlington, Va.
UNIQUENESS OF INVERSE PROBLEM IN GRAVIMETRY FOR HOMOGENEOUS POLYHEDRONS Abstract Only
M. A. Brodskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-04-004) 18 May 1984 p 33-34 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 12, Dec. 1983 p 60-67 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27203# Joint Publications Research Service, Arlington, Va.
SEISMICITY AS STOCHASTIC PROCESS WITH PHYSICAL PARAMETERS Abstract Only
K. I. Kuznetsova *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 35 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 12, Dec. 1983 p 16-28 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27204# Joint Publications Research Service, Arlington, Va.
DEEP GEOPHYSICAL INVESTIGATIONS IN ZONES OF PRESENT-DAY ACTIVE VOLCANISM Abstract Only
I. K. Tuyezov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 36 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 118-120 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27205# Joint Publications Research Service, Arlington, Va.
LOCAL GRAVITY ANOMALIES AND CRUSTAL DENSITY INHOMOGENEITIES IN SOUTHERN KURILE ISLANDS Abstract Only
V. Yu. Kosygin and Yu. A. Susekov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 37 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 105-108 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27206# Joint Publications Research Service, Arlington, Va.
GEOPHYSICAL AND TECTONIC CHARACTERISTICS OF MONGOLIAN-OKHOTSK SEISMIC ZONE Abstract Only
S. V. Gorkusha and L. A. Mastyulin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 37-38 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 52-56 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27207# Joint Publications Research Service, Arlington, Va.
SEISMIC MODEL OF EARTH'S CRUST IN SOUTHERN SEA OF OKHOTSK REGION AND SOME RESULTS OF ITS GEOLOGICAL INERPRETATION Abstract Only
K. F. Sergeyev, V. V. Argentov, and S. K. Bikkenina *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 38-39 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 6, Nov. - Dec. 1983 p 3-12 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27209# Joint Publications Research Service, Arlington, Va.
ECONOMICAL DIFFERENCE METHODS FOR SOLVING DIRECT PROBLEMS IN GRAVIMETRIC AND MAGNETIC PROSPECTING Abstract Only
P. N. Vabishchevich and P. A. Pulatov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 40 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 68-76 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27213# Joint Publications Research Service, Arlington, Va.
DICREPANCIES IN KINEMATIC PARAMETERS OF EARTHQUAKES ACCORDING TO OBSERVATIONS BY REGIONAL AND WORLD NETWORKS OF STATIONS Abstract Only
I. V. Gorbunova and A. I. Pastorov *In its* USSR Rept.: Earth Sci. (JPRS-UES-04-004) 18 May 1984 p 43 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 22-31 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27214# Joint Publications Research Service, Arlington, Va.
EXCITATION OF SPHEROIDAL OSCILLATIONS IN VISCOELASTIC EARTH Abstract Only
S. Ts. Akopyan *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 43-44 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 3-16 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27215# Joint Publications Research Service, Arlington, Va.
POSSIBLE INTERPRETATION OF DISCREPANCY IN RESULTS OF ABSOLUTE GRAVITY DETERMINATION AT SEVRES Abstract Only
M. U. Sagitov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 44 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 2, Jan. 1984 p 300-304 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27216# Joint Publications Research Service, Arlington, Va.
NATURE OF 640-KM SEISMIC BOUNDARY Abstract Only
L. P. Vinnik *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 45 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 4, Jan. 1984 p 296-299 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27217# Joint Publications Research Service, Arlington, Va.
NEW DATA ON UPPER MANTLE LITERAL INHOMOGENEITIES IN WESTERN EURASIA Abstract Only
N. Ya. Kunin and E. R. Sheykh-Zade *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 46 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 273, no. 5, Dec. 1983 p 1087-1090 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27218# Joint Publications Research Service, Arlington, Va.
SHOT WAVES IN FROZEN GROUND Abstract Only
G. M. Lyakhov and G. B. Frash *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 47 Transl. into ENGLISH from Zh. Prikl. Mekhan. i Tekhn. Fiz. (USSR), no. 6, Nov. - Dec. 193 p 52-57 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27220# Joint Publications Research Service, Arlington, Va.
OPTIMUM DENSITY STRUCTURE OF UPPER MANTLE ALONG JAPAN - SHATSKIY RISE - EMPEROR SEA MOUNTS GEOTRAVERSE Abstract Only
V. Yu. Kosygin and V. I. Isayev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 49-50 Transl. into ENGLISH from Tikhookeanskaya Geol. (USSR), no. 5, Sep. - Oct. 1983 p 27-38 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27223# Joint Publications Research Service, Arlington, Va.
POSSIBLE SOURCES OF IRREGULAR GEOMAGNETIC VARIATIONS Abstract Only
V. M. Litinskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 51-52 Transl. into ENGLISH from Geofiz. Zh. (Kiev), vol. 5, no. 6, Nov. - Dec. 1983 p 76-79 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27224# Joint Publications Research Service, Arlington, Va.
IONOSPHERIC EFFECT OF PARTIAL SOLAR ECLIPSE OF 31 JULY 1981 Abstract Only
Ye. P. Datsko, A. G. Kasymova, and O. I. Maksimenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 52-53 Transl. into ENGLISH from Geofiz. Zh. (Kiev), vol. 5, no. 6, Nov. - Dec. 1983 p 71-76 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27225# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF ELECTRIC FIELDS ON POTENTIAL WAVES IN EARTH'S MAGNETOSPHERE Abstract Only
Yu. V. Kyzyurov, A. M. Tupchiyenko, and A. K. Yukhimuk *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 53-54 Transl. into ENGLISH from Geofiz. Zh. (Kiev), vol. 5, no.

6, Nov. - Dec. 1983 p 68-71 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27226# Joint Publications Research Service, Arlington, Va.
UNIQUENESS IN PLANE INVERSE PROBLEMS IN GRAVIMETRY AND MAGNETOMETRY Abstract Only
V. N. Strakhov and M. A. Brodskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 55 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), no. 5, Dec. 1983 p 1097-1101 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27227# Joint Publications Research Service, Arlington, Va.
EMISSION EFFECTS OF MEMORY IN ROCKS Abstract Only
V. V. Rzhevskiy, V. S. Yamshchikov, V. L. Shkuratnik, K. G. Lykov, and V. M. Farafonov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 55-56 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 273, no. 5, Dec. 1983 p 1094-1097 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27228# Joint Publications Research Service, Arlington, Va.
HYDROGEOLOGICAL AND HYDROMETEOROLOGICAL PRECURSORS OF ASHKHABAD CATASTROPHIC EARTHQUAKE Abstract Only
M. R. Mirkis *In* is USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 56-57 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 273, no. 5, Dec. 1983 p 1091-1094 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27230# Joint Publications Research Service, Arlington, Va.
POSSIBILITIES OF STUDYING INELASTIC PROPERTIES AND CHARACTERISTICS OF MEDIUM INHOMOGENEITY USING SPECTRA OF SCATTERED WAVES Abstract Only
I. V. Karpenko, S. G. Karpenko, A. G. Melman, and L. P. Ilnitskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 58-59 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, No. 1, Jan. Feb. 1984 p 61-70 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27231# Joint Publications Research Service, Arlington, Va.
GEOACOUSTIC METHOD FOR CONTINUOUS MONITORING OF STRESSED-STRAINED STATE OF EARTH'S CRUST Abstract Only
T. Z. Verbitskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 59 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, no. 1, Jan. - Feb. 1984 p 55-61 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27232# Joint Publications Research Service, Arlington, Va.
PHYSICAL NATURE OF GEOMAGNETIC MICROBAYS Abstract Only
V. M. Litinskiy and F. I. Sedova *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 60 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, No. 1, Jan. - Feb. 1984 p 54-55 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27233# Joint Publications Research Service, Arlington, Va.
STRUCTURE AND DIRECTION OF EVOLUTION OF EUROPEAN TECTONOSPHERE ACCORDING TO GEOLOGICAL AND GEOPHYSICAL DATA Abstract Only
V. B. Buryanov, V. V. Godlyenko, O. V. Zavgorodnyay, S. N. Kulik, and I. M. Logvinov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 60-61 Transl. into ENGLISH from Geofiz. Zh. (Kiev), v. 6, No. 1, Jan. - Feb. 1984 p 39-48 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27234# Joint Publications Research Service, Arlington, Va.
MODELING ANISOTROPIC PROPERTIES OF MEDIA WITH ORIENTED FRACTURES Abstract Only
T. T. Chergoleishvili, A. A. Balabuyev, and P. F. Mandzhgaladze *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 63 Transl. into ENGLISH from Soobshch. Akad. Nauk Gruzinskoy SSR (USSR), v. 112, no. 2, Nov. 1983 p 297-299 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27240# Joint Publications Research Service, Arlington, Va.
CONDENSATIONAL VARIABILITY OF SCATTERING PHASE FUNCTION Abstract Only
A. A. Isakov, M. A. Sviridenkov, and V. N. Sidorov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 72 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1321-1324 Original language document was announced as A84-21050 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27241# Joint Publications Research Service, Arlington, Va.
PECULIARITIES IN DETERMINING SMALL CONTENTS OF ATMOSPHERIC MOISTURE BY SURFACE RADIO THERMAL SOUNDING METHODS Abstract Only
Sh. D. Kitay *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 73 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1318-1321 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27243# Joint Publications Research Service, Arlington, Va.
ASYMPTOTIC FORMULAS FOR DISTRIBUTION MOMENTS IN SOLUTION OF RADIATION TRANSFER EQUATION IN STOCHASTIC MEDIUM Abstract Only
G. A. Mikhaylov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 74-75 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 19-27 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27244# Joint Publications Research Service, Arlington, Va.
MAGNETIC EFFECT OF QUIET RING CURRENT Abstract Only
Ya. I. Feldshteyn and Ts. D. Prochkhidze *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 75-76 Transl. into ENGLISH from Soobshch. Akad. Nauk Gruzinskoy SSR (USSR), v. 112, no. 2, Nov. 1983 p 301-304 Original language document was announced as A84-28799 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27286*# National Center for Atmospheric Research, Boulder, Colo.
APPLICATIONS OF AIRBORNE REMOTE SENSING IN ATMOSPHERIC SCIENCES RESEARCH
Robert J. Serafin, Gerard Szejwach (Lab. de Meteorologie Dynamique, Palaiseau, France), and Byron B. Phillips *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 259-269 refs Sponsored by NSF (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27292*# Kiel Univ. (West Germany).
TEMPERATURE AND HUMIDITY PROFILES IN THE ATMOSPHERE FROM SPACEBORNE LASERS: A FEASIBILITY STUDY
Hartmut Grassl and Peter Schluessel *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 317-326 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04A

N84-27293*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
A NEW TECHNIQUE FOR MONITORING THE WATER VAPOR IN THE ATMOSPHERE
Harold D. Black and Arie Eisner *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 327-336 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04A

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N84-27370 Texas Univ., Dallas.
ON THE STATISTICAL ANALYSIS OF CLOUD SEEDING EXPERIMENTS Ph.D. Thesis
William Glen Meggs 1984 227 p
Avail: Univ. Microfilms Order No. DA8405898

In the modern history of weather modification by cloud seeding, only one experiment has produced statistically reliable results. A review and evaluation are made for various methodological and statistical problems that have contributed to apparent failure. Powers of some commonly used tests are presented under an assumption of a multiplicative model. The behavior of new and of existing estimators is investigated using Monte Carlo simulation. Finally, a new model of rainfall response to cloud seeding based on meteorological evidence is proposed. Several methods of estimating parameters in the piecewise linear model under various assumptions on the variance structure of the errors are described. Dissert. Abstr.

N84-27371 Oregon State Univ., Corvallis.
A NUMERICAL STUDY OF THE COASTAL STRATUS CLOUD IN A TWO-DIMENSIONAL MESO-SCALE MODEL Ph.D. Thesis
Tae Young Lee 1984 153 p
Avail: Univ. Microfilms Order No. DA8405356

A two dimensional numerical mesoscale model, which includes radiative and turbulent transfers is constructed to study the formation, development and dissipation of coastal stratus cloud under an inversion. This model is applied to a domain which extends 180 km into sea and 240 km inland horizontally and about 2 km from the Earth's surface vertically. The effects of large scale motions are examined. Cloud parameters such as the times of initial formation and of dissipation inland, the maximum distance of inland penetration, the maximum liquid water path and the cloud top height are affected in the presence of such large scale motions. While advection plays a dominant role in the horizontal development of the stratus cloud inland, radiative processes (cooling and heating) are observed to govern vertical growth and dissipation of the cloud layer. Dissert. Abstr.

N84-27372# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
DETECTION OF SEVERE WEATHER BY FAA RADARS Final Report, Apr. 1977 - May 1979
Ella B. Dobson, Freda L. Robison, Abraham Arnold, and Thomas G. Konrad Sep. 1979 169 p refs
(Contract DOT-FA74WA-3423)
(FAA-RD-79-91) Avail: NTIS HC A08/MF A01

A need exists to improve the radar weather display available to air traffic controllers. In support of this objective, theoretical and corresponding empirical investigations were performed to validate the feasibility of using FAA radars (both terminal and enroute) as the sensors to provide the improved input for the weather displays. The theoretical investigation consisted of a computer simulation in which empirical weather data and the parameters of the FAA and NWS radars were used as inputs. By varying the position in range and height of reflectivity profiles, the amount of reflectivity that should be received by the various radars was computed and used to determine values of reflectivity for comparison purposes. The empirical program consisted of measurements by FAA and NWS radars of the power received from the same storms. This information was also converted into reflectivity values for comparison purposes. Both the theoretical and empirical results indicate the FAA radars (when operated in a mode optimized for weather detection) should be capable of providing improved input for use in the display of severe weather in support of air traffic control. Author

N84-27373# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A SYSTEM FOR MANAGING METEOROLOGICAL DATA [SISTEMA DE GERENCIAMENTO DE DADOS METECROLOGICOS]
Fausto Carlos deAlmeida, Jose Aparecido Torsani, Paulo Seiji Nakaya, and Luiz Fernando Capretz Mar. 1984 24 p refs In PORTUGUESE; ENGLISH summary Presented at the 3rd Congr. Brasil. de Agrometeorologica, Campinas, Brazil, 17-22 Jul. 1983 (INPE-3029-PRE/466) Avail: NTIS HC A02/MF A01

The meteorological data management system which permits the consultation, recovery and updating of several types of meteorological data is presented. The total volume and the growth rate of the existing archive are considered, and the utilization of computer resources is minimized. The use of the statistical data base technique was chosen. The data base contains a summary and a mapping of the general archive. A user friendly language was developed which allows on line consultation at the statistical data base. After consultation one may also ask the recovery of actual data, which is realized in batch mode. E.A.K.

N84-27374*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
UPSET SUSCEPTIBILITY STUDY EMPLOYING CIRCUIT ANALYSIS AND DIGITAL SIMULATION
Victor A. Carreno Jun. 1984 25 p refs
(NASA-TM-85822; NAS 1.15:85822) Avail: NTIS HC A02/MF A01 CSCL 12A

This paper describes an approach to predicting the susceptibility of digital systems to signal disturbances. Electrical disturbances on a digital system's input and output lines can be induced by activities and conditions including static electricity, lightning discharge, Electromagnetic Interference (EMI) and Electromagnetic Pulsation (EMP). The electrical signal disturbances employed for the susceptibility study were limited to nondestructive levels, i.e., the system does not sustain partial or total physical damage and reset and/or reload will bring the system to an operational status. The front-end transition from the electrical disturbances to the equivalent digital signals was accomplished by computer-aided circuit analysis. The Super-Sceptre (system for circuit evaluation of transient radiation effects) Program was used. Gate models were developed according to manufacturers' performance specifications and parameters resulting from construction processes characteristic of the technology. Digital simulation at the gate and functional level was employed to determine the impact of the abnormal signals on system performance and to study the propagation characteristics of these signals through the system architecture. Example results are included for an Intel 8080 processor configuration. Author

N84-27375*# Control Data Corp., Minneapolis, Minn.
TABULATIONS OF OZONESONDE DATA, 1963 - 1980 Final Report
W. H. Jasperson and R. W. Wilcox Mar. 1984 345 p refs
(Contracts NAS3-21249; DOT-FA78WAI-893)
(NASA-CR-174631; NAS 1.26:174631; FAA-EE-83-13) Avail: NTIS HC A15/MF A01 CSCL 04B

Ozonesonde data available from the period 1962 to 1980 were compiled and statistics computed. Seasonal and monthly statistics of the mean, standard deviation and the empirical 50th, 84th, and 98th percentiles of ozone are presented as a function of height. The gridded format parallels the format of the GASP data summaries to make an easy comparison. E.A.K.

N84-27376*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DATA AND RESULTS OF A LABORATORY INVESTIGATION OF MICROPROCESSOR UPSET CAUSED BY SIMULATED LIGHTNING-INDUCED ANALOG TRANSIENTS
Celeste M. Belcastro Jun. 1984 28 p refs
(NASA-TM-85821; NAS 1.15:85821) Avail: NTIS HC A03/MF A01 CSCL 04B

A methodology was developed a assess the upset susceptibility/reliability of a computer system onboard an aircraft flying through a lightning environment. Upset error modes in a general purpose microprocessor were studied. The upset tests involved the random input of analog transients which model lightning induced signals onto interface lines of an 8080 based microcomputer from which upset error data was recorded. The program code on the microprocessor during tests is designed to exercise all of the machine cycles and memory addressing techniques implemented in the 8080 central processing unit. A statistical analysis is presented in which possible correlations are established between the probability of upset occurrence and transient signal inputs during specific processing states and operations. A stochastic upset susceptibility model for the 8080 microprocessor is presented. The susceptibility of this microprocessor to upset, once analog transients have entered the system, is determined analytically by calculating the state probabilities of the stochastic model. E.A.K.

N84-27377# Naval Postgraduate School, Monterey, Calif.
RESPONSE OF AN ATMOSPHERIC PREDICTION MODEL TO TIME-DEPENDENT SEA-SURFACE TEMPERATURES M.S. Thesis
P. H. Ranelli Mar. 1984 113 p
(AD-A140730) Avail: NTIS HC A06/MF A01 CSCL 04/2

The purpose of this research is to explore the need for time dependent sea surface temperatures in atmospheric model predictions up to 10 days. The Navy Operational Global Atmospheric Prediction System is used in this study. First, a control run is made in which the sea surface temperature (SST) is fixed in time. In the test case, the observed SST analyzed each 12 hours by the fleet numerical oceanography center are used to force the system. The 10 day predictions are compared to determine if a coupled atmosphere ocean model would improve or deteriorate the atmospheric predictions. The case analyzed occurred after the oceanic spring transition so that only small increases in SST occurred. Use of time dependent SST resulted in only small changes in latent, sensible and total heat fluxes, and in storm tracks and intensities. Thus, further case studies of the atmospheric response are necessary to indicate whether coupled atmosphere ocean models are required on 10 day time scales. GRA

N84-27378# Battelle Pacific Northwest Labs., Richland, Wash.
TURBULENT STRUCTURE OF STABLY STRATIFIED NOCTURNAL SLOPE FLOWS Interim Report, 1 Mar. 1983 - 29 Feb. 1984
J. C. Doran and T. W. Horst Apr. 1984 25 p
(Contract DAAG29-83-K-0052)
(AD-A140740; ARO-19862.1-GS) Avail: NTIS HC A02/MF A01 CSCL 04/2

A series of measurements of the mean and turbulent structure of winds and temperatures over a simple slope during stable nocturnal flows has been carried out. Data from propeller and sonic anemometers, aspirated thermistors, and fast-response platinum resistance thermometers were recorded and analyzed. For moderate downslope flows driven by ambient winds or for winds predominantly in the cross-slope direction, the wind and temperature structure generally resembled that found over flat terrain. During drainage flows, however, the jet in the downslope wind component caused significant changes in the turbulence profiles. Turbulent kinetic energy can increase with height, and the turbulent transport of momentum can reverse sign and be directed upward. Several implications of the drainage wind structure are discussed, and future studies are outlined. GRA

N84-27379# Naval Postgraduate School, Monterey, Calif.
RENORMALIZATION OF SEASONALS IN THE ADDITIVE SEASONAL MODEL: IS IT NECESSARY?
E. McKenzie Feb. 1984 14 p
(RR00001)
(AD-A140799; NPS55-84-007) Avail: NTIS HC A02/MF A01 CSCL 12/1

It is always recommended that the initial estimates of the seasonal factors of the additive seasonal model sum to zero, i.e., are normalized. Once forecasting begins, however, the seasonal factors lose this property. It is often recommended that the factors are renormalized either seasonally or continuously, i.e. with every observation. This document shows that this latter procedure is never necessary since a simple change in the smoothing constants can achieve the same ends. A simpler and more efficient method of obtaining seasonally renormalized forecasts is also given.
Author (GRA)

N84-27380# Dayton Univ., Ohio.
SURVEY OF URBAN METEOROLOGICAL DATA Final Report, Jun. 1982 - Jan. 1983
P. A. Haines White Sands Missile Range, N. Mex. Army Electronics Research and Development Command Jan. 1984 86 p
(Contract DAAD07-80-D-0206; DA Proj. 1L1-61102-B-53-A)
(AD-A140890; ERADCOM/ASL-CR-84-0206-1) Avail: NTIS HC A05/MF A01 CSCL 04/2

The literature was surveyed for observational studies dealing with the effect of the urban boundary on the atmospheric boundary layer. The studies are summarized according to the quantity and quality of wind, temperature, relative humidity, and turbulence data. In addition, urban areas with limited urban data are listed. From the various studies, the data arising from the Regional Air Pollution Study (RAPS) in St. Louis and the Uppsala Urban Meteorological Project (UUMP) were selected for incorporation in an urban meteorological data base. RAPS and UUMP data were procured. The land use of both areas was classified according to a scheme that is meteorologically based. GRA

N84-27381# TRW Space Technology Labs., Redondo Beach, Calif.
CONDITIONS FOR TWO-CELL STRUCTURE IN SEVERE VORTICAL STORMS Final Report, 7 Sep. 1983 - 3 Feb. 1984
G. F. Carrier, F. E. Fendell, P. S. Feldman, and S. F. Fink Feb. 1984 112 p
(Contract N00014-79-C-0508)
(AD-A138242; TRW-35524-6003-UT-00) Avail: NTIS HC A06/MF A01 CSCL 04/2

Predictive capability for the intensity of severe vortical storms of the troposphere entails anticipation of which systems will undergo transition from one-cell to two-cell structure, and which will not. Roughly half of all tropical storms, and nearly half of all mesocyclones, undergo this transition, in which the low-level pressure differential between periphery and center may increase from 0(1%) to 0(10%) of atmospheric pressure, and the peak swirl speed may increase from 0(50 m/s) to 0(100 m/s). The transition entails insertion of relatively dry, nonrotating, compressionally heated, tropopause-level air at the axis of the vortex, such that slowly recirculating air (an eye) displaces to an annulus (the eyewall) the rapidly swirling cloudy updraft arising from separation of the low-level inflow layer. This investigation inquires whether the vertical stratification of the circulation at the periphery of the vortex (which varies only slowly in time) might not provide a relatively accessible observable that suggests whether two-cell structure can be sustained by the vortex. GRA

N84-27382# Royal Netherlands Meteorological Inst., De Bilt. Dynamisch Meteorologisch Onderzoek.
A SCHEME FOR MASS AND WIND ANALYSIS ON A LIMITED AREA USING MULTIVARIATE THREE-DIMENSIONAL OPTIMUM INTERPOLATION: SCIENTIFIC DOCUMENTATION AND FIRST EVALUATION
G. J. Cats 1984 55 p refs
(KNMI-TR-46) Avail: NTIS HC A04/MF A01

A series of programs designed as a framework for a variety of wind and mass analyses is outlined. The suite consists of an initial program to construct a control file with parameters such as area, and observations to be used. It is followed by a data extraction program. A preanalysis program treats observational data. Optimum interpolation precedes a postanalysis program which converts the optimum interpolation output to standard file formats. Two programs prepare for the next analysis in a sequence of analyses: one forecasts the first-guess and one forecasts the errors of the first-guess. The first-guess forecast is included to test the scheme in an analysis sequence, it is not an integral part of the suite. Author (ESA)

N84-27383# Maryland Univ., College Park. Dept. of Meteorology.
APPLICATIONS OF SATELLITE OBSERVATIONS TO THE RADIATION BUDGET, FLUXES AND THE GENERAL CIRCULATION Final Report
F. Baer Aug. 1983 83 p refs
(Contract NA80AA-D-00035)
(PB83-256818; SR-83-18) Avail: NTIS HC A05/MF A01 CSCL 04B

Atmospheric heat budget, infrared radiation flux density, infrared window radiance, and atmospheric circulation are discussed in the course of three articles. A technique for estimating the longwave radiation budget using data from NOAA satellite radiance observations was examined. The relationship between total longwave radiation flux density and infrared window radiance was determined through interpretation of satellite observations. Atmospheric circulation was estimated from satellite-measured infrared radiation data. The correlation between convective activity and the strength of the jet stream was assessed. R.S.F.

N84-27384# Wyoming Univ., Laramie. Dept. of Atmospheric Science.
CLOUD PHYSICS STUDIES IN SCPP (SIERRA COOPERATIVE PILOT PROJECT) DURING 1982-1983 Annual Interim Progress Report, Oct. 1982 - Sep. 1983
Brooks E. Martner, John D. Marwitz, Alfred R. Rodi, and Wayne R. Sand Oct. 1983 142 p refs
(Contract DI-2-07-81-V0256)
(PB84-176452; AS145) Avail: NTIS HC A07/MF A01 CSCL 04B

Several articles on cloud physics and meteorology are presented. The aircraft and radar derived responses of orographic clouds to seeding by dry ice and silver iodide are summarized. The observed thermodynamic and kinematic structure of two stable orographic storms are described. Precipitation processes in two stable orographic storms are discussed. The theoretical and observed precipitation processes are compared. Brief discussions of tornadoes, vertical wind velocity, and hailstorms are included. R.S.F.

N84-27385# National Environmental Satellite Service, Washington, D. C.
MARINERS WEATHER LOG, VOLUME 28, NUMBER 1, JANUARY-FEBRUARY-MARCH 1984
Elwyn E. Wilson, ed. 1984 70 p
(PB84-175710; NOAA-84031203) Avail: NTIS HC A04/MF A01 CSCL 04B

Several aspects of marine meteorology are considered, including cyclogenesis, cyclones, and tropical storms. Imagery from GOES satellites is presented. Topics briefly mentioned are: Infrared Astronomy Satellite (IRAS) observations of cosmic dust clouds around stars, atmospheric CO2 concentration, and hurricanes. R.S.F.

N84-27077*# Cornell Univ., Ithaca, N.Y. School of Electrical Engineering.
THE MST RADAR TECHNIQUE: REQUIREMENTS FOR OPERATIONAL WEATHER FORECASTING
M. F. Larsen *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 3-11 refs (For primary document see N84-27076 17-42)
(Grant AF-AFOSR-0100-83)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27078*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
JET STREAM RELATED OBSERVATIONS BY MST RADARS
K. S. Gage *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 12-21 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27110*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ESTIMATING UNBIASED HORIZONTAL VELOCITY COMPONENTS FROM ST/MST RADAR MEASUREMENTS: A CASE STUDY
W. L. Clark, J. L. Green, and J. M. Warnock *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 210-214 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27111*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ON THE MEASUREMENT OF VERTICAL VELOCITY BY MST RADAR
K. S. Gage *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 215-226 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27112*# National Oceanic and Atmospheric Administration, Boulder, Colo. Aeronomy Lab.
ACCURACY OF VERTICAL VELOCITY DETERMINATION
A. C. Riddle *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 227-231 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27113*# Illinois Univ., Urbana. Aeronomy Lab.
EFFECTS OF GEOPHYSICAL NOISE ON THE ACCURACY OF WIND DETERMINATION Abstract Only
S. A. Bowhill *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 235-236 (For primary document see N84-27076 17-42)
(Grants NsG-7506; NSF ATM-81-20371)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27178# Joint Publications Research Service, Arlington, Va.
CLIMATE MODELING AT PACIFIC OCEAN INSTITUTE OF GEOGRAPHY
S. Glukhov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 1-4 Transl. into ENGLISH from Vozdushnyy Transport (Moscow), 15 Feb. 1984 p 4 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27179# Joint Publications Research Service, Arlington, Va.
EVALUATION OF PROBABILITIES OF LARGE DEVIATIONS OF CLIMATIC CHARACTERISTICS FROM PRESENT LEVELS Abstract Only
P. F. Demchenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 5 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1259-1266 Original language document was announced as A84-21045 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27181# Joint Publications Research Service, Arlington, Va.
MODELING SEASONAL EVOLUTION OF THERMAL REGIME OF OCEAN-ATMOSPHERE SYSTEM Abstract Only
B. A. Kagan, V. A. Ryabchenko, and A. S. Safray *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 7 Transl.

into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 48-56 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27182# Joint Publications Research Service, Arlington, Va.
TURBULENT PULSATIONS OF HORIZONTAL AND VERTICAL WIND VELOCITY COMPONENTS IN CLOUDS OF DIFFERENT GENERA Abstract Only
I. P. Mazin, V. I. Silayeva, and M. A. Strunin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 8 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), no. 1, Jan. 1984 p 10-18 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27183# Joint Publications Research Service, Arlington, Va.
DENSITY, SPECIFIC HUMIDITY AND WATER VAPOR ELASTICITY ABOVE CONDENSATION LEVEL Abstract Only
M. P. Arveladze, G. K. Sulakvelidze, and Ya. G. Sulakvelidze *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 8-9 Transl. into ENGLISH from Soobshch. Akad. Nauk Gruzinskoy SSR (USSR), v. 112, no. 2, Nov. 1983 p 305-308 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27189# Joint Publications Research Service, Arlington, Va.
FRACTIONATION OF CHEMICAL ELEMENTS AT OCEAN-ATMOSPHERE INTERFACE Abstract Only
A. A. Bezborodov, L. V. Yeremeyeva, and S. V. Lishenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 18-19 Transl. into ENGLISH from Kodl. Akad. Nauk Ukr. SSR, Ser. B: Geol., Khim. i Biol. Nauki (Kiev), no. 1, Jan. 1984 p 6-9 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MMF A01

N84-27192# Joint Publications Research Service, Arlington, Va.
SOME CHARACTERISTICS OF RADIATION FIELD IN MEDIUM WITH FLUCTUATING OPTICAL PARAMETERS Abstract Only
I. L. Katsev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 22 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 11, Nov. 1983 p 1172-1179 Original language document was announced as A84-19537 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27196# Joint Publications Research Service, Arlington, Va.
CROSS-SPECTRAL ANALYSIS OF ATMOSPHERIC PRESSURE MICROFLUCTUATIONS AND LOW-FREQUENCY SEA LEVEL CHANGES Abstract Only
V. S. Bychkov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 25 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 20, no. 1, Jan. 1984 p 57-64 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27198# Joint Publications Research Service, Arlington, Va.
QUASIBIENNIAL CYCLE OF THERMODYNAMIC ATMOSPHERE-OCEAN INTERACTION IN NORTH ATLANTIC Abstract Only
B. A. Nelepo, V. V. Yefimov, and A. A. Sizov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 26-27 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 4, Feb. 1984 p 922-925 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27235# Joint Publications Research Service, Arlington, Va.
ALGORITHM FOR DETERMINING COORDINATES OF HYPOCENTERS OF NEAR EARTHQUAKES AND SEISMIC WAVE PROPAGATION VELOCITY IN LAYER Abstract Only
V. Yu. Burmin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 65-66 Transl. into ENGLISH from Vulkanol. i Seysmologiya (Moscow), no. 5, Sep. - Oct. 1983 p 81-90 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27273*# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Space Programme Dept.
OCEAN WIND FIELD MEASUREMENT PERFORMANCE OF THE ERS-1 SCATTEROMETER
Peter Hans and H. Schuessler *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 115-122 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27288*# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
MICROWAVE REMOTE SENSING OF OCEAN SURFACE WIND SPEED AND RAIN RATES OVER TROPICAL STORMS
Calvin T. Swift, D. C. Dehority, Peter G. Black (NOAA, Miami, Fla.), and Jian-Zhong Chien (Tsinghua Univ., China) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 281-286 ref (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27291*# Washington Univ., Seattle. Dept. of Atmospheric Sciences.
OBSERVING ATMOSPHERIC WATER IN STORMS WITH THE NIMBUS 7 SCANNING MULTICHANNEL MICROWAVE RADIOMETER
Kristina B. Katsaros and Robert M. Lewis *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 307-316 refs (For primary document see N84-27262 17-43) (Grant NAG5-354)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27294*# Bar-Ilan Univ., Ramat-Gan (Israel). Dept. of Geography.
CASE STUDIES OF NOAA 6/TIROS N DATA IMPACT ON NUMERICAL WEATHER FORECASTS
Leonard M. Druyan, Zvi Alperson (Israel Meteorological Service, Bet-Degan), and Tamar Ben-Amram (Israel Meteorological Service, Bet-Degan) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 337-344 refs Sponsored by NOAA (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27295*# National Oceanic and Atmospheric Administration, Washington, D. C. National Environmental Satellite, Data and Information Service.
THE IMPACT OF SATELLITE TEMPERATURE SOUNDINGS ON THE FORECASTS OF A SMALL NATIONAL METEOROLOGICAL SERVICE
Noah Wolfson (NAS-NRC), Albert Thomasell, Zvi Alperson (Israel Meteorological Service, Bet-Dagan), Harold Brodrick, Jy-Tai Chang (Systems and Applied Sciences Corp.), Arnold Gruber, and George Ohring *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 345-356 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27296*# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
THE VARIABILITY OF THE SURFACE WIND FIELD IN THE EQUATORIAL PACIFIC OCEAN: CRITERIA FOR SATELLITE MEASUREMENTS
David Halpern *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 357-366 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27313*# City Coll. of the City Univ. of New York.
VECTOR WIND, HORIZONTAL DIVERGENCE, WIND STRESS AND WIND STRESS CURL FROM SEASAT-SASS AT ONE DEGREE RESOLUTION
Willard J. Pierson, Jr., Winfield B. Sylvester, and Robert E. Salfi (Hofstra Univ., Hempstead, N.Y.) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 557-566 refs (For primary document see N84-27262 17-43)
(Grant NAGw-266)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27314*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE IMPACT OF SCATTEROMETER WIND DATA ON GLOBAL WEATHER FORECASTING
David Atlas, W. E. Baker, E. Kalnay, M. Halem, Peter M. Woiceshyn (JPL, Pasadena, Calif.), and Steven Peteherych (Atmospheric Environment Service, Downsview, Ontario) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 567-573 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 04B

N84-27315*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FIRST GLOBAL ANALYSIS OF SEASAT SCATTEROMETER WINDS AND POTENTIAL FOR METEOROLOGICAL RESEARCH
Steven Peteherych (Atmospheric Environment Service, Downsview, Ontario), Morton G. Wurtele (California Univ., Los Angeles), Peter M. Woiceshyn (JPL, Pasadena, Calif.), Dale H. Boggs (DB Systems Ltd., Inc., La Canada, Calif.), and Robert R. Atlas *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 575-585 refs (For primary document see N84-27262 17-43)
(Contract NAS7-918)
Avail: NTIS HC A99/MF A01 CSCL 04B

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N84-27386# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A NUMERICAL MODEL FOR STUDYING SOME COASTAL CIRCULATION [UM MODELO NUMERICO PARA ESTUDOS DE ALGUMAS CIRCULACOES OCEANICAS COSTEIRAS]
Marco A. Maringolo Lemes, Yoshihiro Yamazaki, and Claudio Solano Pereira Oct. 1983 21 p refs In PORTUGUESE; ENGLISH summary
(INPE-2904-RPE/444) Avail: NTIS HC A02/MF A01

Coastal circulations complexity is caused by various physical processes that act simultaneously and interact in a nonlinear fashion. These circulations are influenced by the tidal forces, Earth's rotation, stratification, shape of the coastline, bottom topography and boundary layer processes. A two layer, bidimensional model, in finite differences form, to study the phenomena of coastal upwelling and their transient stages is presented. Implicit finite difference schemes are used to treat the terms for the propagation of barotropic as well baroclinic gravity waves, which allows larger time increments. The use of a staggered grid for the model variables implies a reduction of memory capacity and at the same time reproducing with better accuracy the shorter wave phase velocities. The method of solution consists of solving iteractively two coupled equations which involve the divergence fields of the flow in the two layers. The vorticity fields are obtained, to determine the velocity and thickness fields of the layer. E.A.K.

N84-27387# Institute of Marine Research, Helsinki (Finland).
INVESTIGATION OF ICE DYNAMICS IN THE MARGINAL ICE ZONE Final Technical Report, Jan. - Dec. 1983
Matti Lepparanta and William D. Hibler, III (Army Cold Regions Research and Engineering Lab.) Dec. 1983 102 p refs
(Contract DAJA45-83-C-0034; Grant N00014-83-WR-3005)
(AD-A138558) Avail: NTIS HC A06/MF A01 CSCL 08/12

The dynamics of sea ice in the marginal ice zone (MIZ) are considered both from theoretical and from experimental point of view. Modeling studies were carried through with three types of ice rheologies: free drift, linear viscosity and plasticity. It is suggested that ice thickness variations may be important to the dispersion of ice edge and lead to clustering of ice strength rather than variable forcing is likely to produce sharp changes in ice velocity near the ice edge. Steady state ideal plastic solutions give a constant ice flow under constant forcing in the MIZ. In general, ice interaction has a rectifying effect on the flow pattern. Ice kinematics measurements were made with the Del Norte microwave trisponder system in MIZEX-83 Greenland Sea experiment. Differential ice motion was measured with four stations on the ice in the scale of 5 km at three minute intervals. On several occasions a rapid slip occurred in measured distances.
Author (GRA)

N84-27388# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
ANALYZING TEMPERATURE DATA FROM XBT GRID SURVEYS Final Report
M. Karweit Jan. 1984 53 p
(AD-A140685; NORDA-TN-250) Avail: NTIS HC A04/MF A01 CSCL 08/10

This report considers a set of 78 XBT casts obtained by NAVOCEANO on the second leg of its cruise to the Norwegian Sea, Spring 1981. The data were taken in a grid pattern over a rectangular segment of ocean 66.95 -- 67.40 deg N latitude and -5.60 -- -4.35 deg W longitude, in a day and a half. The survey was to measure the spatial properties of the temperature field. This report analyzes the data with that perspective, and focuses on estimating isotherm surfaces as characterizations of the temperature field. The data from each cast are reduced to a set of depths at which the temperatures 0, 1, 2, and 3 dec C occurred. With these depths as data, two techniques are considered for estimating isotherm-depth maps: a two-dimensional Fourier series analysis, and an optimal objective analysis. Calculations of the spatial and temporal correlation of the data indicate that these analyses cannot be legitimately applied; and that a spatial characterization of this area is not possible with this data set. Mean depth and slope statistics for the isotherm depths are given. To complete the work, a discourse on measurement error with XBTs is presented, especially as it relates to the estimation of isotherm depths.
GRA

N84-27389# Woods Hole Oceanographic Institution, Mass.
A COMPILATION OF MOORED CURRENT METER DATA FROM THE REGION OF THE NORTH PACIFIC BOUNDARY CURRENT, VOLUME 33
A. Spencer, D. Chausse, and W. B. Owens Mar. 1984 40 p
(Contracts N00014-79-C-0071; N00014-82-C-0019)
(AD-A140687; WHOI-84-6) Avail: NTIS HC A03/MF A01 CSCL 08/3

An array of 15 current meters was set in the Northern Pacific from June 1981 to July 1982. It was located along 175 W from 51 N to 46 N, and instruments were set at 2000 m and deeper. The objective was to explore the northern boundary current system of the North Pacific. Current and temperature measures were made. The data are presented graphically as time series, histograms, scatter plots, progressive vector diagrams and spectral plots. Tables of statistics of temperature and velocity are also shown.
GRA

N84-27390# Office of Naval Research, Bay St. Louis, Miss. Oceanic Chemistry and Biology Group.
PROGRESS REPORT ABSTRACTS, OCEANIC BIOLOGY PRO-

GRAM Annual Report, Sep. 1981 - Oct. 1982
Dec. 1982 112 p
(AD-A140840) Avail: NTIS HC A06/MF A01 CSCL 08/1

The 1982 Progress Report Abstracts of the Oceanic Biology Program represents the fourteenth year in which the projects supported by the program have been represented in a report of this nature. Progress Report Abstracts is the single document of the Program that brings together all the investigations receiving support and relates them to broad naval problem areas while presenting a brief of the scientific objectives and accomplishments. The purpose of these Abstracts is twofold. They serve to introduce and relate the Program to other offices and bureaus of the Navy as well as other government agencies. Secondly, but perhaps more importantly, they serve as an avenue for coordination and communication among investigators whose projects are sponsored by this Program. A broad range of studies in marine biology and biological oceanography is represented. Techniques and approaches used by one discipline may also prove useful to others, and the forum presented by these abstracts can provide an interchange that normally might not result from a literature search or dialogues with colleagues. Author (GRA)

N84-27391# Lamont-Doherty Geological Observatory, Palisades, N. Y.
CANYON AND SLOPE PROCESSES STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report
Sep. 1983 19 p Sponsored by Minerals Management Service, Vienna, Va. 3 Vol.
(Contract DI-14-12-0001-29178)
(PB84-169481; MMS/AT/ES-84/01) Avail: NTIS HC A02/MF A01 CSCL 08A

Dominant physical and biological processes operating in submarine canyon and slope areas of the eastern U.S. continental margin were examined to determine how the effects of continental shelf activities might be transmitted to benthic communities. Five areas were examined in detail: Baltimore Canyon and the slopes between Lindenhohl and Carteret Canyons, and also between Toms and Meys Canyons, in the Mid-Atlantic; and Lydonia Canyon and the slope between Hydrographer and Veatch Canyons in the North Atlantic. Study depths ranged from 100 to 2000 meters. Physical parameters examined included mean current flows, suspended sediment transport, nutrient transport, nutrient concentrations, and hydrography. Biological parameters studied included: surface and near bottom zooplankton (Mid-Atlantic only), and megafaunal populations. Author (GRA)

N84-27392# Lamont-Doherty Geological Observatory, Palisades, N. Y.
CANYON AND SLOPE PROCESSES STUDY. VOLUME 2: PHYSICAL PROCESSES Final Report
Kenneth Hunkins, Wilford D. Gardner, and Jeanne C. Stepien Sep. 1983 324 p refs Sponsored by Minerals Management Service, Vienna, Va. 3 Vol.
(Contract DI-14-12-0001-29178)
(PB84-169499; MMS/AT/ES-84/02) Avail: NTIS HC A14/MF A01 CSCL 08A

Dominant physical processes operating in submarine canyon and slope areas of the eastern U.S. continental margin were examined to determine how the effects of human activities on the continental shelf might be transmitted to benthic communities. The physical parameters investigated in detail were sediments and sediment transport, nutrients, and ocean currents. Specific points discussed included: ocean depth, temperature gradients, hydrography, upwelling, and flow distribution. R.S.F.

N84-27393# Lamont-Doherty Geological Observatory; Palisades, N. Y.
CANYON AND SLOPE PROCESSES STUDY. VOLUME 3: BIOLOGICAL PROCESSES Final Report
Barbara Hecker, D. T. Logan, F. E. Gandarillas, P. R. Gibson, and Jeanne C. Stepien Sep. 1983 215 p refs Sponsored by Mineral Management Service, Vienna, Va. 3 Vol.
(Contract DI-14-12-0001-29178)
(PB84-169507; MMS/AT/ES-84/03) Avail: NTIS HC A10/MF A01 CSCL 08A

Dominant physical and biological processes operating in submarine canyon and slope areas of the eastern U.S. continental margin are examined to determine how the effects of OCS activities might be transmitted to benthic communities. Five areas are examined. Physical parameters examined include mean current flows, suspended sediment transport, nutrient transport, nutrient concentrations, and hydrography. Biological parameters include surface and near-bottom zooplankton and megafaunal populations. Some measures for elimiriating or alleviating deleterious impacts of OCS development are identified. GRA

N84-27186# Joint Publications Research Service, Arlington, Va.
TRAPPED TOPOGRAPHIC WAVES IN BALTIC SEA Abstract Only
L. A. Talpsepp *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 16 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 928-931 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27188# Joint Publications Research Service, Arlington, Va.
SEASONAL VARIABILITY OF SURFACE CURRENTS IN WORLD OCEAN Abstract Only
A. L. Brekhovskikh, Yu. L. Demin, and T. V. Shakhanov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 18 Transl. into ENGLISH from Okeanologiya (Moscow), v. 23, no. 6, Nov. - Dec. 1983 p 917-922 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27193# Joint Publications Research Service, Arlington, Va.
SHELF WAVES IN PRESENCE OF CURRENTS AND STABILITY OF BOUNDARY CURRENTS Abstract Only
V. V. Yefimov and I. V. Fayn *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 22-23 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1288-1294 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27194# Joint Publications Research Service, Arlington, Va.
ASYMPTOTIC FORM OF SOLUTION OF PROBLEM OF SEASONAL EVOLUTION OF THERMAL REGIME IN OCEAN Abstract Only
N. B. Maslova and V. A. Ryabchenko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 23-24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1328-1331 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27195# Joint Publications Research Service, Arlington, Va.
FORMING OF UPPER HOMOGENEOUS LAYER IN MEDITERRANEAN BASIN Abstract Only
Yu. A. Ivanov, Ye. A. Plakhin, and V. I. Byshev *In its* USSR Rept.: Earth Sci. (JPRS-UES-04-004) 18 May 1984 p 24 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1312-1317 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27210# Joint Publications Research Service, Arlington, Va.
DENSITY INHOMOGENEITIES IN UPPER MANTLE OF EASTERN INDIAN OCEAN Abstract Only
N. V. Petersen and S. M. Golynskiy *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 40-41 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Zemli (Moscow), no. 10, Oct. 1983 p 55-67 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-27263*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

REMOTE SENSING FOR OCEANOGRAPHY: PAST, PRESENT, FUTURE
Lawrence F. McGoldrick *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 1-10 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27282*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEASUREMENTS OF OCEAN WAVE SPECTRA AND MODULATION TRANSFER FUNCTION WITH THE AIRBORNE TWO FREQUENCY SCATTEROMETER
David E. Weissman (Hofstra Univ.) and James W. Johnson *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 215-232 refs (For primary document see N84-27262 17-43)
(Grant NAGw-468)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27283*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME CASE STUDIES OF OCEAN WAVE PHYSICAL PROCESSES UTILIZING THE GSFC AIRBORNE RADAR OCEAN WAVE SPECTROMETER
Fred C. Jackson *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 233-245 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27285*# Universite Catholique de Louvain (Belgium). Faculte des Sciences Appliquees.
A TENTATIVE UNIFIED SEA MODEL FOR SCATTERING AND EMISSION Abstract Only
A. Guissard and P. Sobieski *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 257 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27302*# Environmental Research Inst. of Michigan, Ann Arbor. Radar Div.
MODELING OF SAR SIGNATURES OF SHALLOW WATER OCEAN TOPOGRAPHY
Robert A. Shuchman, A. Kozma, E. S. Kasischke, and D. R. Lyzenga *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 415-430 refs (For primary document see N84-27262 17-43)
(Contracts N00014-81-C-2254; DMA800-78-C-0060; N00014-81-C-2308; N00014-81-C-0692)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27303*# Tel-Aviv Univ. (Israel). Faculty of Engineering.
COASTAL BATHYMETRY AND CURRENTS FROM LANDSAT DATA Abstract Only
Norman Rosenberg *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 431 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27304*# Johns Hopkins Univ., Baltimore, Md. Dept. of Earth and Planetary Sciences.
ON THE RESPONSE TO OCEAN SURFACE CURRENTS IN SYNTHETIC APERTURE RADAR IMAGERY
O. M. Phillips *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 433-452 refs (For primary document see N84-27262 17-43)
(Grant NAGw-304; Contract N00014-76-c-0184)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27305*# British Columbia Univ., Vancouver. Dept. of Oceanography.
VARIATIONS IN SURFACE CURRENT OFF THE COASTS OF CANADA AS INFERRED FROM INFRARED SATELLITE IMAGERY
W. J. Emery, M. Ikeda, L. A. Mysak, and P. H. LeBlond *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 453-478 refs Sponsored by Natural Sciences and Engineering Research Council of Canada (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27306*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
THE DEPICTION OF ALBORAN SEA GYRE DURING DONDE VA? USING REMOTE SENSING AND CONVENTIONAL DATA
Paul E. LaViolette *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 479-496 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27307*# Institut de Physique du Globe, Paris (France). Lab. de Physique et Chimie de l'Hydrosphere.
SOMALI CURRENT STUDIED FROM SEASAT ALTIMETRY
C. Perigaud, J.-F. Minster, V. Zlotnicki (MIT, Cambridge), and G. Balmino (CNES, Toulouse, France) *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 497-499 (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27316*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
THE IMPORTANCE OF ALTIMETER AND SCATTEROMETER DATA FOR OCEAN PREDICTION
Harley E. Hurlburt *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 587-599 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27317*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Dynamical Ocean Forecasting Branch.
SAMPLING STRATEGIES AND FOUR-DIMENSIONAL ASSIMILATION OF ALTIMETRIC DATA FOR OCEAN MONITORING AND PREDICTION
John C. Kindle, J. Dana Thompson, and Harley E. Hurlburt *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 601-612 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

N84-27318*# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Dynamic Ocean Forecasting Branch.
THE INFLUENCE OF ACTUAL AND APPARENT GEOID ERROR ON OCEAN ANALYSIS AND PREDICTION Abstract Only
J. Dana Thompson *In* NASA. Marshall Space Flight Center Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms May 1984 p 613-614 refs (For primary document see N84-27262 17-43)
Avail: NTIS HC A99/MF A01 CSCL 08C

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N84-27394*# Maryland Univ., College Park. Dept. of Neurology.
SEX STEROIDS DO NOT AFFECT MUSCLE WEIGHT, OXIDA-

TIVE METABOLISM OR CYTOSOLIC ANDROGEN RECEPTION BINDING OF FUNCTIONALLY OVERLOADED RAT PLANTARIS MUSCLES

Stephen R. Max and Naoimi Rance [1983] 23 p refs Sponsored in part by NIH

(Grant NAG2-100)

(NASA-CR-173630; NAS 1.26:173630) Avail: NTIS HC A02/MF A01 CSCL 06C

The effects of sex steroids on muscle weight and oxidative capacity of rat planaris muscles subjected to functional overload by removal of synergistic muscles were investigated. Ten weeks after bilateral synergist removal, plantaris muscles were significantly hypertrophic compared with unoperated controls. After this period, the ability of the muscles to oxide three substrates of oxidative metabolism was assessed. Experimental procedures are discussed and results are presented herein. Results suggest a lack of beneficial effect of sex hormone status on the process of hypertrophy and on biochemical changes in overloaded muscle. Such findings are not consistent with the idea of synergistic effects of sex steroids and muscle usage. R.S.F.

N84-27395*# Ohio State Univ., Columbus. Dept. of Botany.

SUPPRESSION OF ASYMMETRIC ACID EFFLUX AND GRAVITROPISM IN MAIZE ROOTS TREATED WITH AUXIN TRANSPORT INHIBITORS OF SODIUM ORTHOVANADATE

Timothy J. Mulkey and Michael L. Evans [1982] 17 p refs Submitted for publication

(Grants NAGw-297; NSF PCM-81-03298)

(NASA-CR-173634; NAS 1.26:173634) Avail: NTIS HC A02/MF A01 CSCL 06C

In gravitropically stimulated roots of maize (Zea mays L., hybrid WF9 x 38MS), there is more acid efflux on the rapidly growing upper side than on the slowly growing lower side. In light of the Cholodny/Went hypothesis of gravitropism which states that gravitropic curvature results from lateral redistribution of auxin, the effects of auxin transport inhibitors on the development of acid efflux asymmetry and curvature in gravistimulated roots were examined. All the transport inhibitors tested prevented both gravitropism and the development of asymmetric acid efflux in gravistimulated roots. The results indicate that auxin redistribution may cause the asymmetry of acid efflux, a finding consistent with the Cholodny/Went hypothesis of gravitropism. As further evidence that auxin-induced acid efflux asymmetry may mediate gravitropic curvature, sodium orthovanadate, an inhibitor of auxin-induced H+ efflux was found to prevent both gravitropism and the development of asymmetric acid efflux in gravistimulated roots. Author

N84-27396# University of South Florida, Tampa.

AN INSTRUMENTAL CONDITIONING METHOD FOR ESTABLISHING CHRONIC AROUSAL Final Report, Apr. 1976 - Dec. 1983

H. D. Kimmel and M. R. Murrin Dec. 1983 25 p

(Contract DAMD17-76-C-6053; DA Proj. 3M1-61102-BS-01)

(AD-A140808) Avail: NTIS HC A02/MF A01 CSCL 05/10

Eight Macaque monkeys received discriminative avoidance-punishment conditioning of the SCR while eight others were yoked controls. Half of each group had discriminative stimuli for 24 sessions and no stimuli for the next six sessions, while the other half had no stimuli for 24 sessions and stimuli for six sessions. Significantly more SCR's occurred during avoidance-punishment in experimental and yoked groups, but this difference vanished when actual time to respond was considered. Yoked subjects made more responses than experimental subjects, but only with discriminative stimuli present. Experimental subjects had higher HR in avoidance and punishment and during time out as compared to yoked controls. There was no difference in shock frequency with and without the stimulus, but shocks occurred during punishment than avoidance. Differences between these and previous results may have been due to species differences or to multiple equipment failures. GRA

N84-27397# Joint Publications Research Service, Arlington, Va.

USSR REPORT: LIFE SCIENCES BIOMEDICAL AND BEHAVIORAL SCIENCES

22 Jun. 1984 126 p refs Transl. into ENGLISH from various Russian articles

(JPRS-UBB-84-013) Avail: NTIS HC A07/MF A01

Topics concerning biomedical, agricultural and behavioral technology are discussed. Subjects include environmental studies and modeling, epidemiology, nutrition, genetic engineering, immunology, human performance clinical medicine, and virology. Studies on nonionizing electromagnetic radiation and laser effects as well as conference proceedings are included. For individual titles, see N84-27398 through N84-27414.

N84-27398# Joint Publications Research Service, Arlington, Va.

PHYSIOLOGICAL ASSESSMENT OF CAPACITY FOR PROCESSING INCREASING AMOUNTS OF VISUAL INFORMATION BY HUMAN OPERATORS Abstract Only c53

V. V. Gorbunov, N. V. Makarenko, and V. V. Dosychev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 37 Transl. into ENGLISH from Zh. Vyssh. Nervnoy Deyatelnosti (Moscow), v. 33, no. 6, Nov. - Dec. 1983 p 1028-1033 (For primary document see N84-27397 17-51)

Avail: NTIS HC A07/MF A01

Determinations are made of the psychophysiological correlates involved in the processing of increasing quantities of visual information within a limited period of time. Standard techniques are employed in assessing 147 subjects, 19-25 years old, subjected to an increasing volume of visual input (30-160 signals/min) while engaged in a ternary selection test. On the basis of the probability of error-free performance, the subjects fell into 3 groups in relation to the volume of signal input processed and 0.95 probability of error-free performance: Group I--up to 80 signals/min. Group II--up to 90 signals/min, and Group III--up to 110 signals/min. A further increase in visual signal presentation led to a decrease in information processing. Correlation with a variety of physiological characteristics (heart rate, respiratory rate, EEG parameters, etc.) indicated that the rate of information processing is directly related to individual physiological reserves, and suggested that further improvements could be anticipated by appropriate job training. M.A.C.

N84-27399# Joint Publications Research Service, Arlington, Va.

BIOFEEDBACK METHODS AND QUALITY OF OPERATOR'S PERFORMANCE Abstract Only c54

M. V. Frolov, V. A. Glazkova, and L. S. Khachaturyants *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 38 Transl. into ENGLISH from Psikhologicheskiy Zh. (Moscow), v. 5, no. 2, Mar. - Apr. 1984 p 85-91 (For primary document see N84-27397 17-51)

Avail: NTIS HC A07/MF A01

The quality of an operator's performance depends substantially on the functional state of the individual and on his emotional stress. An instruction method is proposed in the system of biofeedback to a random direction by the functional state based on the laws of adaptive selfregulation. A model is developed with a work schedule leading to a stress of the operator. Four stage experiments are performed; (1) training of the test subjects to solve the operator's tasks (OT), (2) modelling of OT under stress conditions, (3) education of subjects on controlling their emotional conditions by the biofeedback methods, and (4) modelling of OT under stress. After BioFeedback Selfregulation BFS, the test subjects performed better, they were more relaxed and their work was more accurate. After training in the BFS system, errors in solving OT dropped considerably, and the physiological exertion in solving various problems dropped also. M.A.C.

N84-27400# Joint Publications Research Service, Arlington, Va.

GENETIC CONTROL AND PHENOTYPIC CORRECTION OF CELLULAR IMMUNE RESPONSE TO H-ANTIGEN OF SALMONELLA TYPHIMURIUM Abstract Only

A. A. Nasyrov, N. Yu. Alekseyeva, I. Ya. Moshiashvili, and R. M. Khaitov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 39 Transl. into ENGLISH from Patol. Fiziol. i Eksperim. Terapiya (Moscow), no. 4, Jul. -

Aug. 1983 p 32-34 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

Genetic determinancy of cellular immune response to H-antigen (H-AG) of S. typhimurium is studied along with possibilities of correcting it by a series of synthetic polyelectrolytes. The experiments are performed on CBA, C57Bl/6l, CC57W, A/Sn mice and on (CBAXC57BL/6l) F(1) hybrids. The highest inhibition of macrophage migration is observed during immunization of mice with 60 microgram dose of H-AG. The highest quantity of the factor inhibiting migration (FIM) produced by lymphocytes is observed 6 days after immunization with H-AG, on the CBA mice and on (CBAXC57BL/Gl) F(1) hybrids; the lowest, on the A/Sn and CL57W mice. Phenotypic correction of cellular and humoral immune response could be achieved with synthetic polyelectrolytes. The best effect is achieved with the copolymer of acrylic acid and N-vinylpyrrolidone. M.A.C.

N84-27401# Joint Publications Research Service, Arlington, Va.
MODELLING OF MULTI-SIGNAL IMMOBILIZED IMMUNOGENS Abstract Only
K. P. Kashkin and A. L. Liozner *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 39-40 Transl. into ENGLISH from Patol. Fiziol. i Eksperim. Terapiya (Moscow), no. 4, Jul. - Aug. 1983 p 73-82 Original language document previously announced in IAA as A84-22931 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

The immobilization of antigen (hapten) determinants on a polystyrene sorbent is described as a possible model for obtaining artificial immunogens capable of delivering a prescribed spectrum of signals with the aim of activating B-lymphoyctes. An experiment was conducted to study the primary and secondary antibody response of a total population of mice spleen cells to hapten groups in conjunction with proteins, polypeptides, or monoamino acids. It is concluded that the proposed modeling approach shows promise for experimental and clinical development; one of its applications may be the immunization of cells of the lymphoid system outside the body in cases when the in vivo administration of the immunogen is impossible owing to the characteristics of the recipient. B.J. (IAA)

N84-27402# Joint Publications Research Service, Arlington, Va.
LACK OF AN EFFECT OF CORPUSCULAR VACCINE AGAINST I PHASE Q-FEVER ON PERSISTENCE AND REACTIVATION OF COXIELLA BURNETII INFECTION IN MOUSE AND GUINEA PIGS TISSUE Abstract Only
J. Kazar and E. Kovacova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 40 Transl. into ENGLISH from Acta Virologica (Bratislava), v. 27, no. 4, Sep. 1983 p 418-428 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

The Presence of C. burnetii is investigated in the tissues of mice and guinea pigs immunized with corpuscular vaccine against I phase Q fever, from one to six months after infection with C. burnetii. Other experimental groups include animals injected with cortisone or cyclophosphamide (CPA) and mice which become pregnant during the course of the experiments. During early stages of infection, large quantities of ricketsiae accumulate in the spleen and liver. With time, these organs are cleared of these infectious agents but during the late stages of infection, it still persists in reproductive organs and in kidneys. The persistence of C. burnetii is not affected by immunization with the vaccine against Q fever. Treatment with cortisone appears to increase production of I and II phase antibodies, while treatment with CPA led to a decreased level of antibodies. M.A.C.

N84-27403# Joint Publications Research Service, Arlington, Va.
USE OF RADIAL HEMOLYSIS METHOD IN GEL FOR DETECTION OF ANTIBODIES TO BUNYA VIRUS LEDNICE (TURLOCK VIRUS GROUP) Abstract Only
D. Malkova, N. Krpesova, J. Holubova, and J. M. Kolman *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 41 Transl. into ENGLISH from Acta Virologica (Bratislava), v. 27, no. 5, Sep. 1983 p 439-441 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

Due to its simplicity, specificity and economy, the reaction of radial hemolysis in gel (RHG) is used to direct antibodies in experiments with the Lednice 6118 virus of the Turlock group, Bunyaviridae family. This method gives reliable and specific results. No mass reactivity is noted with sera of other arboviruses. Comparison of antibody titres obtained in reactions in RHG, hemaglutination inhibition reaction and indirect immunofluorescence showed that RHG is a sensitive reaction. M.A.C.

N84-27404# Joint Publications Research Service, Arlington, Va.
CLINICAL-IMMUNOLOGICAL SPECTRUM OF LEISHMANIASES Abstract Only
E. Ye. Shuykina *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 41 Transl. into ENGLISH from Med. Parazitologiya i Parazitarnyye Bolezni (Moscow), no. 5, Sep. - Oct. 1983 p 3-10 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

Select characteristics of clinical immunological spectra of Leishmaniases are analyzed on the basis of clinical manifestations, the response to infection and on the type of immunodepression. Two groups are identified; (1) infections caused by L. donovani and (2) those caused by the dermotropic species. The infections caused by L. donovani are characterized by typical clinical manifestations. In cases of cutaneous leishmaniasis the diffuse and tuberculoid forms were polar, depending on the type of acquired response (B or T). The other cutaneous and noncutaneous leishmaniases involved both systems of immunity and are intermediate between the poles of the spectrum of activities. M.A.C.

N84-27405# Joint Publications Research Service, Arlington, Va.
RELATIONSHIP BETWEEN CARDIOVASCULAR SYSTEM RESPONSE AND ADRENOCORTICAL GLUCOCORTICOID FUNCTION ON EXPOSURE TO DIFFUSE, LOW-INTENSITY HELIUM-NEON LASER EMISSION c36
I. N. Ushkova, L. A. Pokrovskaya, G. S. Stepanov, I. M. Suvorov, M. Ye. Kogan, and Ye. F. Grishina *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 42-45 refs Transl. into ENGLISH from Gigyena Tr. i Prof. Zabolevaniya (Moscow), no. 11, 1983 p 47-48 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

The effect of light from a low intensity helium neon laser on the formation of a series of adaptive processes in the body is investigated. The study is carried out on 32 chinchilla rabbits, weighing from two to two point five kilograms. The right eyes of the creatures were subjected to diffuse laser radiation, for 30 days, 14 minutes per day, under conditions of low illumination. Controls are rabbits under the same conditions, but not exposed to laser radiation. In order to isolate the early glucocorticoid response to the treatment, the hydrocortisone content of the blood is determined which permitted judgment on presence of a functional cumulation effect. The body developed an adaptive/compensatory reaction to the laser radiation so that hydrocortisone levels and the system's hemodynamics and nervous system returned to normal. M.A.C.

N84-27406# Joint Publications Research Service, Arlington, Va.
LASER CELL ANALYZER Abstract Only c36
Z. Z. Latypov and N. O. Skvortsova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 46 Transl. into ENGLISH from Med. Tekhn. (Moscow), no. 6, Nov. - Dec. 1983 p 11-16 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

A laser counter of biological cells and transparent particles in suspension is developed and a prototype constructed. The counting is based on detection of light scattered from the particles within an angle range of 20-40 C. The selected geometry of the optical

system yields a high signal level at a 3 milliwatts power of the laser source and relatively small overall dimensions of the counter. A flow through curvette with hydrodynamic focusing of the suspension assures more rapid counting and analysis rates of the particle providing a potential for studies and for diagnosis of cellular populations by histograms. M.A.C.

N84-27407# Joint Publications Research Service, Arlington, Va.
HEALTH EDUCATION OF POPULATION IN CONECTION WITH WIDESPREAD USE OF LASER RADIATION Abstract Only **c36**

V. A. Kashuba and A. V. Bykhovskiy *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 47 Transl. into ENGLISH from Gigiyena i Sanit. (Moscow), no. 12, Dec. 1983 p 35-37 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

Rapid development of laser technology and its adaptation in many areas of national economy make it mandatory to develop a state system of laser safety. Due to absence of visible injuries of those working with laser equipment, a certain degree of bravado has developed among the technical personnel servicing laser instruments. There are no courses available for technicians and professionals concerning safety procedures. To solve this problem, a coordinated program must be organized country-wide with cooperation of physicians, labor safety specialists, preventive medicine experts and hygienists. Stressing the preventive aspects, this effort should lead to development of sound habits and proper technical knowhow. Author

N84-27408# Joint Publications Research Service, Arlington, Va.
LASER DOPPLER SPECTROSCOPY OF BIOLOGICAL OBJECTS Abstract Only **c36**

Yu. I. Posudin *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 47-48 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 7, Jul. 1983 p 29-37 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

Basic principles of laser Doppler spectroscopy are reported along with the results of spectral and autocorrelational measurements of movement parameters of a series of biological objects. The most characteristic examples of the use of massive and individual methods were used to show the potential and precision of laser Doppler spectroscopy. The subject and the methods of laser Doppler spectroscopy, its mathematical and physical principles, the spectrum and autocorrelation function of light scattering and of the photoflow, spectral and autocorrelative determinations and finally individual and massive methods of determining photomobility of microorganisms are examined. Laser Doppler spectroscopy is a unique and highly precise instrument for studying biological objects. The level of its monochromatic source, spatial coherence and intensity make it possible to study problems which have been impossible with classical spectroscopy and microscopy. Author

N84-27409# Joint Publications Research Service, Arlington, Va.
ACTIVITY OF RESPIRATORY SYSTEM DURING LASER IRRADIATION OF BRAIN STRUCTURES Abstract Only **c36**

N. A. Merkulova and L. I. Sergeyeva *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 48-49 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 8, Aug. 1983 p 47-51 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

The performance of one of the principal links of the respiratory system, the respiratory center, was studied as a function of the exposure of the medulla oblongata and the sensomotor zone of the cerebral hemisphere cortex to low level laser irradiation in the red wavelength of the spectrum. Experiments were done on white rats under barbital anesthesia. Under such conditions a substantial effect was observed on the activity of the respiratory center. Laser light may display activating or inhibitory influences, in some cases the bilateral symmetry of the activity of the respiratory center is affected indicating deep changes in the integrative mechanism of the functioning of the right and left sides of the hemispheres. The laser beam effect depends on many factors: specific light properties, duration of the exposure, repetition of exposures, initial functional state of the CNS, etc. Author

N84-27410# Joint Publications Research Service, Arlington, Va.
ALLOMONADES: NEW GROUP OF VIBRIONACEAE FAMILY MICROORGANISMS Abstract Only

G. P. Kalina, A. G. Somova, V. A. Nikonova, T. P. Turova, T. I. Grafova, L. S. Podosinnikova, M. I. Lapenkov, and I. M. Badalova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 76 Transl. into ENGLISH from Zh. Gigiyeny Epidemiol. Mikrobiologii i Immunol. (Moscow), v. 27, no. 3, 1983 p 271-279 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

During evaluation of the applicability of the A-2 prime medium in separating acromonades, which develop on this medium, from vibrions which do not, a new group of microorganisms was identified. After thorough taxonomic investigation which included evaluation of phenotypic properties, statistical treatment of the results obtained, determination of phenotypic similarities according to Adanson-Sneath and study of the DNA composition and of the level of DNA hybridization, this group was identified as Allomonas enterics sp. nov. from the family Vibrionaceae. Author

N84-27411# Joint Publications Research Service, Arlington, Va.
EFFECT OF DECIMETER WAVES ON PHYSICAL-CHEMICAL STATE OF MEMBRANES, THYMOCYTE CHROMATIN AND IMMUNOLOGICAL REACTIVITY OF AN ORGANISM Abstract Only **c52**

Z. A. Sokolova, S. M. Zubikova, I. D. Frenkel, S. B. Pershin, and V. M. Bogolyubov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 77 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no. 2, Mar. - Apr. 1983 p 6-10 Original language document previously announced in IAA as A83-40567 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

The various effects of decimeter waves on the structural condition of nuclear chromatin and the cytoplasmic and nuclear membranes of thymocytes, depending on their location, were studied in healthy rabbits. Results show that decimeter waves activate the genetic system of thymus cells and intensify the effects of 7-(p-methoxybenzylamino)-4-nitrobenzoxydiazol and chlorotetracycline which are connected with the membranes of the cell and the nucleus of thymocytes, during irradiation of the thyroid gland, as well as reduce these parameters during action on the projection zone of the adrenal glands and the temporal parietal region. At the same time, corresponding changes in the proliferating processes in the lymph tissues were observed. The mechanisms of these shifts are examined. N.B. (IAA)

N84-27412# Joint Publications Research Service, Arlington, Va.
CHANGE IN SPECTRUM OF BLOOD HORMONES UNDER INFLUENCE OF CENTIMETER RANGE MICROWAVES Abstract Only **c52**

L. A. Nikolayeva and V. S. Ulashchik *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 77-78 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no. 2, Mar. - Apr. 1983 p 11-13 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

The effect of centimeter range microwaves (CMW) on the functions of hypophysis, adrenals, thyroid and pancreatic glands was evaluated experimentally. The experiments were done on chinchilla rabbits, exposing them to a single and repeated courses of CMW 20 min at intensities of 50, 90 and 170 mW/sq. cm. The following determinations were performed in plasma: ACTH, somatotrophic hormone, cartisol, thyroxin, triiodothyrocin and insulin. A single exposure to 50 and 90 mW/sq cm dose led to the largest increases in secretions of various glands. High doses appeared to depress the secretary function. Hypophysis and

adrenal hormones were affected more than any other hormones. Serial application of CMW led to decreased productivity of endocrine glands. Author

N84-27413# Joint Publications Research Service, Arlington, Va.
GENE MUTATIONS, CHROMOSOME ABERRATIONS AND SURVIVABILITY AFTER X-RAY IRRADIATION OF CHINESE HAMSTER CELL CULTURE UNDER CONDITIONS OF CYSTEAMINE PROTECTION Abstract Only c52
T. V. Yesilova and T. P. Feoktistova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 82 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 7, Jul. 1983 p 92-97 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

Experimental results were reported to the determination of protective action of cysteamine on the yield of genetic mutations, chromosome aberrations and cell kill during reproduction, evidently due to damage of genetic structures. The experiments were performed on transplanted fibroblast cells of Chinese hamsters, clone 431 in which 80% of the cells had pseudodiloidy. A dose-modifying factor of 2 was established for chromosome aberrations and cell inactivation and a factor of 2.8 for the gene mutations. The data obtained led to a conclusion that there are general protective mechanisms which include the reaction of cysteamine on the radiation-chemical level and possible effect on the reparative processes. Author

N84-27414# Joint Publications Research Service, Arlington, Va.
POSSIBILITIES OF CREATING INVARIANT MAN-MACHINE SYSTEMS Abstract Only c54
V. G. Zazykin *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 91-92 Transl. into ENGLISH from Psikhologicheskiy Zh. (Moscow), v. 5, no. 2, Mar. - Apr. 1984 p 76-84 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

An important task of engineering psychology is the design of systems which, while performing their functions, could compensate for various disturbances, i.e., design of invariant systems. Invariant systems are systems with complete or almost complete functional independence of the disturbance acting on them. Three main research directions were identified for the invariant systems: the problem of disturbance compensation, development of methods for transferring of the controlling effects without changes and delays and development of analytical methods and syntheses of control with flexible structures. Theoretical analysis and experimental work performed on a system of observation and stabilization showed it was possible to construct invariant man-machine systems (MMS). Author

N84-27425# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Weltraumbiologie.
DO LIVING CELLS HAVE A GOOD SENSITIVITY TO GRAVITY [GIBT ES EINE GENERELLE SCHWERKRAFTEMPFINDLICHKEIT LEBENDER ZELLEN]
Wolfgang Breigleb *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 87-97 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

N84-27426# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Biophysik.
BIOPHYSICS SPACE RESEARCH [BIOPHYSIKALISCHE FORSCHUNG IM WELTRAUM]
Horst Buecker *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 99-103 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N84-27415* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 259)
Jun. 1984 129 p refs
(NASA-SP-7011(259); NAS 1.21:7011(259)) Avail: NTIS HC $7.00 CSCL 06E

A bibliography containing 476 documents introduced into the NASA scientific and technical information system in May 1984 is presented. The primary subject categories included are: life sciences, aerospace medicine, behavioral sciences, man/system technology, life support, and planetary biology. Topics extensively represented were space flight stress, man machine systems, weightlessness, human performance, mental performance, and spacecraft environments. Abstracts for each citation are given. R.S.F.

N84-27416*# Federation of American Societies for Experimental Biology, Bethesda, Md.
RESEARCH OPPORTUNITIES IN MUSCLE ATROPHY Final Report
G. J. Herbison, ed. (Thomas Jefferson Univ. Hospital, Philadelphia) and J. M. Talbot, ed. Washington NASA Apr. 1984 90 p refs (Contract NASw-3728)
(NASA-CR-3796; NAS 1.26:3796) Avail: NTIS HC A05/MF A01 CSCL 06P

Muscle atrophy in a weightless environment is studied. Topics of investigation include physiological factors of muscle atrophy in space flight, biochemistry, countermeasures, modelling of atrophied muscle tissue, and various methods of measurement of muscle strength and endurance. A review of the current literature and suggestions for future research are included. M.A.C.

N84-27417*# Federation of American Societies for Experimental Biology, Bethesda, Md.
RESEARCH OPPORTUNITIES IN BONE DEMINERALIZATION, PHASE 3 Final Report
S. A. Anderson, ed. and S. H. Cohn, ed. (Brookhaven National Lab.) Washington NASA Apr. 1984 76 p refs
(Contract NASw-3728)
(NASA-CR-3795; NAS 1.26:3795) Avail: NTIS HC A05/MF A01 CSCL 06P

An overview of bone demineralization during space flight, observations in bone demineralization and experiments related to bone loss planned for Spacelab flights, and suggestions for further research are investigated. The observations of the working group focused upon the following topics: (1) pathogenesis of bone demineralization, (2) potential for occurrence of renal stones consequent to prolonged hypercalciuria, (3) development of appropriate ground based and inflight models to study bone demineralization, (4) integration of research efforts, and (5) development of effective countermeasures. M.A.C.

N84-27418# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Flugmedizin.
ARE LIVING CELLS SENSITIVITY TO GRAVITY?
Oct. 1983 132 p refs In GERMAN; ENGLISH summary Meeting held in Cologne, 10 Mar. 1982 Report will also be announced as Translation (ESA-TT-857)
(DFVLR-Mitt-83-19; ESA-TT-857) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

A summary of the research and development program in aerospace medicine and a discussion on analogies of control mechanisms in flight guidance and medicine, results from the different departments are presented. Models describing the influence of mechanical energy on man and for the evaluation of work load of pilots are examined. The relationship between

personality and efficiency, the influence of gravity on cells and on the human cardiovascular system, and aspects and results of biophysics space research are discussed. The new deep diving simulator (TITAN) and biochemical research on the effects of unphysiological oxygen supply are outlined. For individual titles, see N84-27419 through N84-27428.

N84-27419# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Flugmedizin.

THE RESEARCH PROGRAM OF THE INSTITUTE FOR AEROSPACE MEDICINE [DAS FORSCHUNGSPROGRAMM]

K. E. Klein *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 9-14 In GERMAN (For primary document see N84-27418 17-52)

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

Goals, tasks, research and development in aerospace medicine are outlined. Psychological, biological, biophysical, research in the human, animal and plant environment, is discussed. Important aspects of aeronautics, space transportation or oceanography are outlined. Biological models were developed to study the influence of technology on the human body. Transl. by E.A.K.

N84-27420# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Forschungsbereich Flugmechanik.

ANALOGIES BETWEEN CONTROL MECHANISMS IN FLIGHT GUIDANCE AND MEDICINE [ANALOGIEN BEI REGELUNGSVORGAENGEN IN DER FLUGFUEHRUNG UND IN DER MEDIZIN]

Fred Thomas *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 15-25 In GERMAN (For primary document see N84-27418 17-52)

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The relationship between flight control systems and air traffic control are examined. The two systems developed individually from each other, yet the contact between the two disciplines gave information to the development of aerospace sciences. It is found that: (1) physicians and engineers can make progress and exchange ideas in the field of expertise; (2) technological and engineering inventions, can be applied to medical science; (3) technological and engineering inventions can be applied to medical science; and (4) the system oriented reorganization of self-regulation of component oriented symptomatic treatment is the preferred medical therapy. Transl. by E.A.K.

N84-27421# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Verkhrsmedizin.

A MECHANICAL MODEL OF THE HUMAN BODY AND ITS APPLICATION [EIN MECHANISCHES MODELL DES MENSCHLICHEN KOERPERS UND SEINE ANWENDUNG]

Hans Lorentz Vogt *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 27-43 In GERMAN (For primary document see N84-27418 17-52)

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

Human reaction to mechanical vibration and shock was evaluated. Shock tests led to direct solution of the problem. A mathematical model to calculate the reactions of the human body and its compensation system was developed. Mathematical models of humans have the advantage that they are rather easy to curve, when the human dynamic characteristics are known. The design and validation of the dynamic response index model are shown by centrifugal setting. Transl. by E.A.K.

N84-27422# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Flugphysiologie.

MODELS FOR THE EVALUATION OF WORK LOADS OF CREWS DURING LONG DISTANCE FLIGHT [MODELLE ZUR BEURTEILUNG DER BELASTUNG VON FLUGBESATZUNGEN AUF LANGSTRECKENFLUEGEN] **c54**

Hans Martin Wegmenn *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 45-56 refs In GERMAN (For primary document see N84-27418 17-52)

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

Pilot fatigue, operational stresses, and demands were measured. A model which measures human fatigue and tolerance was designed. Different investigations were compared and are discussed. The models determine quantitatively and the following operational stresses: length of effort; afterflight, different crossed time zones, departure and arrival time, length of transit stops, number of flight days, and accumulated flight services during tour of duty. The compilation of the factors provide numerical values which predict the stresses of a final cycle or a single segment. Transl. by E.A.K.

N84-27423# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Hamburg (West Germany). Abt. Flugpsychologie.

THE RELATIONSHIP BETWEEN PERSONALITY AND EFFICIENCY [UEBER DEN ZUSAMMENHANG ZWISCHEN PERSOENLICHKEIT UND LEISTUNG] **c53**

Konrad Steininger *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 57-66 refs In GERMAN (For primary document see N84-27418 17-52)

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The relationship between human personality and efficiency application to machine systems under changing environmental conditions was investigated. It is found that there is a relationship between personality factors and their combinations and their relationship to certain efficiency tasks which indicates a multiple dynamic effectiveness between personality and efficiency. The human personality and contribution to success on operating the complex man-machine systems depends also on work protection and accident investigation, safety management, the work conditions and training. Transl. by E.A.K.

N84-27424# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Weltraummedizin.

CARDIOVASCULAR REACTIONS ON ORTHOSTASIS AND WEIGHTLESSNESS [HERZ-KREISLAUFREAKTIONEN BEI ORTHOSTASE UND SCHWERELOSIGKEIT] **c53**

Friedhelm Baisch *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 67-85 refs In GERMAN (For primary document see N84-27418 17-52)

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The cardiovascular system and its reaction to weightlessness was studied. It was found that under circulatory the hematological parameters changes under weightless conditions. The astronaut is orthostatic tolerant of other return from space. Systolic blood pressure reactions in a space environment are studied. Readjustment to Earth gravity can take up to 6 months. Transl. by E.A.K.

N84-27425# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Weltraumbiologie.

DO LIVING CELLS HAVE A GOOD SENSITIVITY TO GRAVITY [GIBT ES EINE GENERELLE SCHWERKRAFTEMPFINDLICHKEIT LEBENDER ZELLEN] **c51**

Wolfgang Breigleb *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 87-97 refs In GERMAN (For primary document see N84-27418 17-52)

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The influence of gravity on living cells was investigated. Three categories for the single cells of the multiple cells in plants were studied. The categories are: (1) metabolism control; (2) estimated sense performance of autonomously moving cells; (3) polarization by external stimulation during egg growth. It is found that the categories could be effective tools in metabolic control and in

structure and movement of macromolecular cell structure.
Transl. by E.A.K.

N84-27426# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Biophysik.
BIOPHYSICS SPACE RESEARCH [BIOPHYSIKALISCHE FORSCHUNG IM WELTRAUM] c51
Horst Buecker *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 99-103 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The influence of ionizing radiation on humans and the environment was examined. Ionizing radiation which is a natural environmental phenomenon under which all vents in the biosphere take place is discussed. Sources of the different components of this radiation of gamma guantas, alfa and beta particles and neutrons influence the radioisotopes of elements and nuicear reaction products, which are produced in the Earth atmosphere by cosmic particle bombardments. The biological workings of heavy ions of galactic cosmic radiation were examined. The late damage to biological tissues which may be caused by compactly ionized outer space radiation, which exists in heavy ions or reaction stars is investigated.
Transl. by E.A.K.

N84-27427# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst fuer Flugmedizin.
THE DEEP DIVING SIMULATOR TITAN: PHYSIOLOGICAL PROBLEMS OF STAYS IN LARGE WATER DEPTHS [DER TIEFTAUCHSIMULATOR TITAN PHYSIOLOGISCHE PROBLEME BEIM AUFENTHALT IN GROSSEN WASSERTIEFEN]
Hans Dietrich Fust *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 105-119 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The effects of pressure and drop in pressure on humans was investigated in deep water environments. The different reactions to identical physiological problems, and the reaction and consequence on humans are examined. The various biophysical and medical measurements of human reactions to very deep waters were conducted with diving simulators. The TITAN measures overpressure in a gaseous atmosphere or in water. The TITAN interior is described and technical data are presented.
Transl. by E.A.K.

N84-27428# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Biochemie.
THE EFFECTS OF NONPHYSIOLOGICAL OXYGEN SUPPLY ON THE ORGANISM [DER EINFLUSS UNPHYSIOLOGISCHER SAUERSTOFF-VERSORGUNG AUF DEN ORGANISMUS]
G. Schaefer *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 121-130 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The effects of nonphysiological oxygen supply to human and mamalian organs was investigated. Different methods to measure the oxygen supply are described. The coordinated absorption of the molecular oxygen in the hemoglobin alows a relatively light addition and rate of O2 which corresponds with the pO2 of the environment. Central nervous excitation and inhibition effect are caused by equal electric signals, yet are modulated to the nerve cells by neurotransmitters. The physiological function of the GABA is not an inhibiting factor on the neuromuscular activity. It is suggested that one of the many possible GABA effects are reduced and this may prevent stress causing situations in humans.
Transl. by E.A.K.

N84-27429# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
A NON-DIMENSIONAL ANALYSIS OF CARDIOVASCULAR RESPONSE TO COLD STRESS. PART 1: IDENTIFICATION OF THE PHYSICAL PARAMETERS THAT GOVERN THE THERMOREGULATORY FUNCTION OF THE CARDIOVASCULAR SYSTEM Interim Progress Report, Jun. - Sep. 1983
Daniel J. Schneck Bethesda, Md. Naval Medical Research Inst. 1 Sep. 1983 89 p refs
(AD-A138710; NMRI-83-51) Avail: NTIS HC A05/MF A01 CSCL 06/19

Whether in combat-type situations, or during peace-time, Man constantly strives to increase the envelope of human performance capabilities. One environmental factor that appears to seriously impede such capabilities is the ambient temperature within which the performance takes place. Cold stress and or the consequences of hypothermia can lead to adverse effects that range from severe impairment of physiological function to death, itself. The prevailing belief today is that vascular changes and tissue hypoxia are directly responsible for all types of local cold injury, and that variation in the clinical features or manifestations reflects variation in the nature of the insult and the host response. With this in mind, this study has examined the human cardiovascular system in terms of its four basic elements. The fluid (blood), the pump (Heart), the flow pipes (vascular system), and the control mechanisms (intrinsic factors, the central and autonomic nervous systems, and the endocrine system). Then, cardiovascular thermoregulation has been described in terms of how each of these elements responds to cold stress, with the ultimate intent of performing a non-dimensional analysis of this response. As a first step towards such an analysis, some 400 physical and chemical parameters that govern the thermoregulatory function of the cardiovascular system have been identified.
GRA

N84-27430# Georgia Inst. of Tech., Atlanta.
DEVELOPMENT OF AN EM-BASED LIFEFORM MONITOR Annual Technical Report
J. Seals, S. M. Sharpe, and M. L. Studwell Mar. 1984 67 p
(Contract N00014-82-C-0390)
(AD-A140583; ATR-2) Avail: NTIS HC A04/MF A01 CSCL 06/2

Georgia Tech is currently conducting a program to develop an electromagnetically-based lifeform monitor capable of evaluating the medical status of battlefield casualties from extremely long ranges (10-100 meters). This lifeform monitor operates by measuring and analyzing scattered electromagnetic fields to detect respiratory-related and cardiac-related body motions in the casualty being evaluated. Because antenna-based techniques are used to perform the required scattered field measurements, the instrumentation being developed on this program achieves true remote operation. That is, personnel being evaluated do not wear or carry a biomedical transducer or any other type of auxiliary device. This fact greatly enhances the attractiveness and potential usefulness of this approach.
GRA

N84-27431# Brown Univ., Providence, R. I. Center for Neural Science.
AUTOMATIC CONTROL OF A VISUAL PHYSIOLOGY EXPERIMENT, USING MINC
D. Ryan, S. Veillette, and J. D. Daniels 24 Apr. 1984 51 p
(Contract N00014-81-K-0136)
(AD-A140607; TR-13) Avail: NTIS HC A04/MF A01 CSCL 06/16

We automated a visual physiology experiment that formerly was performed manually. The control of a light stimulus was synchronized with the collection of nerve cell response from kitten visual cortex, using Digital Equipment Corporation's MINC. The computer was integrated into several aspects of the experiment, ranging from data manipulation, storage, and histogramming, to the control of the stimulus sweep, orientation, speech, and duration. The computer also directed nerve spike output to a screen, a printer and a floppy disc memory.
Author (GRA)

N84-27432# Yale Univ., New Haven, Conn.
THERMOREGULATION: LONG-TERM MICROWAVE EFFECTS Final Report, 1 Feb. 1983 - 31 Jan. 1984

E. R. Adair 17 Apr. 1984 3 p
(Contract N00014-83-K-0076; RR0-4108)
(AD-A140844; JBP-ONR-2) Avail: NTIS HC A02/MF A01 CSCL 06/18

A pilot study investigated the consequences of chronic exposure to 2450-MHz CW microwaves, or sham exposure, in a cold (18 deg C) environment on the thermoregulatory responses, both behavioral and physiological, of squirrel monkeys. Two animals exposed to microwaves exhibited responses that were little different from those measured in animals residing in thermoneutral environments while two sham-exposed animals sustained thermoregulatory deficits. These tentative findings require replication. GRA

N84-27433# Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
MENTAL PERFORMANCE IN MILD OXYGEN DEFICIENCY
L. Innes and M. F. Allnutt Jun. 1967 17 p refs
(IAM-409; BR89879) Avail: NTIS HC A02/MF A01

The effects of a simulated 10,000 ft altitude on mental ability over a 100 min period were studied, using the WAIS Digit Span, Coding Test, Letter Test, Test of "g' Culture Fair, and a Complex Discrimination Test. Ten young male subjects were divided into two groups, one performing the tests while breathing ambient air and the other while breathing a 15.4% oxygen in nitrogen mixture. The pre-exposure period for both groups prior to testing was 30 min. Differences between the groups are not significant at any stage. There are consistent indications, however, that the 10,000 ft breathing mixture causes longer times to understand new problems, and slower reaction times for most test items, although accuracy is not affected. Author (ESA)

N84-27434# National Inst. of Mental Health, Rockville, Md. Lab. of Neurophysiology.
NEUROPHYSIOLOGICAL APPROACHES TO HIGHER BRAIN FUNCTIONS
Edward V. Evarts, Yoshikazu Shinoda (Tokyo Medical and Dental Univ.), and Steven P. Wise Feb. 1984 320 p refs
(PB84-175769; NIHM-84-388) Avail: NTIS HC A14/MF A01 CSCL 06P

Strategies for studying neural circuits involved in higher brain function are examined. The capacity of an animal to elaborate plans for impending action, exemplifies a higher brain function amenable to neurophysiologiene study. GRA

N84-27435 Wisconsin Univ., Madison.
THE INFLUENCE OF SLEEP STATE ON VENTILATORY CONTROL IN HUMANS Ph.D. Thesis
Anne Diana Berssenbrugge 1983 232 p
Avail: Univ. Microfilms Order No. DA8400478

The influence of sleep state on both mechanical and chemical determinants of breathing in healthy humans is examined. Ventilatory compensation to brief inspiratory resistive mechanical loads during wakefulness included a compensatory increase in central inspiratory activity, and a preservation of tidal volume and minute ventilation. Arousal is a critical compensation to loading since the ability to defend minute ventilation is severely compromised during sleep. The roles of sleep state, hypoxia and hypocapnia in the genesis of hypoxia-induced periodic breathing (HIPB) are assessed. A selective influence of sleep state on the integrated response to respiratory afferent stimuli is shown. While sleep state had no effect on acclimatization, it is a crucial determinant of both mechanical load compensation and ventilatory pattern stability under conditions of hypocapnic hypoxia. Dissert. Abstr.

N84-26636# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
VISUAL PERCEPTION THROUGH WINDSCREENS: EFFECTS OF MINOR OCCLUSIONS AND HAZE ON OPERATOR PERFORMANCE
W. W. Kama *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 825-848 (For primary document see N84-26596 17-01)
(AD-P003223) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-27411# Joint Publications Research Service, Arlington, Va.
EFFECT OF DECIMETER WAVES ON PHYSICAL-CHEMICAL STATE OF MEMBRANES, THYMOCYTE CHROMATIN AND IMMUNOLOGICAL REACTIVITY OF AN ORGANISM Abstract Only
Z. A. Sokolova, S. M. Zubikova, I. D. Frenkel, S. B. Pershin, and V. M. Bogolyubov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 77 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no. 2, Mar. - Apr. 1983 p 6-10 Original language document previously announced in IAA as A83-40567 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27412# Joint Publications Research Service, Arlington, Va.
CHANGE IN SPECTRUM OF BLOOD HORMONES UNDER INFLUENCE OF CENTIMETER RANGE MICROWAVES Abstract Only
L. A. Nikolayeva and V. S. Ulashchik *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 77-78 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no. 2, Mar. - Apr. 1983 p 11-13 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27413# Joint Publications Research Service, Arlington, Va.
GENE MUTATIONS, CHROMOSOME ABERRATIONS AND SURVIVABILITY AFTER X-RAY IRRADIATION OF CHINESE HAMSTER CELL CULTURE UNDER CONDITIONS OF CYSTEAMINE PROTECTION Abstract Only
T. V. Yesilova and T. P. Feoktistova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 82 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 7, Jul. 1983 p 92-97 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N84-27436# Stanford Univ., Calif. Dept. of Psychology.
RISK: THE LONG AND THE SHORT
A. Tversky and M. Bar-Hillel (Hebrew Univ.) Jun. 1983 26 p
(Contract N00014-79-C-0077)
(AD-A140580) Avail: NTIS HC A03/MF A01 CSCL 05/10

This paper was stimulated by a recent article of Lola Lopes (1982) Decision Making in the Short Run, that challenges the normative adequacy of expected utility theory. This note addresses some of the issues raised by Lopes and rebuts her main arguments. The authors propose a new normative treatment and a psychological analysis of an interesting gambling problem introduced by Paul Samuelson (1963) in his article Risk and Uncertainty: A Fallacy of Large Numbers. GRA

N84-27437# Army Research Inst. of Environmental Medicine, Natick, Mass.
A BRIEF HISTORY OF THE USE OF SIMULATION TECHNIQUES IN TRAINING AND PERFORMANCE ASSESSMENT
E. S. Stein and J. L. Kobrick 27 Apr. 1984 19 p
(AD-A140763; USARIEM-M-22/84) Avail: NTIS HC A02/MF A01 CSCL 15/7

Simulation might be generally viewed as a form of controlled fantasy with a finite and functional purpose. Fantasy and imagination are universal features of human life, and have several constructive aspects, including the release of tension. The potential uses of simulation in research and Army training are many and diverse. The main advantages of using simulation techniques are lower cost, greater control and higher safety conditions. An effective simulation must place human participants in a realistic situation or

operational environment where they can perform their actual duties. This behavior will be a function both of what they bring with them (skills, knowledge, abilities, motivation), and the contingencies established by the situation. By balancing the fidelity required to get the job done against the operating cost to achieve it, researchers and trainers can create settings which motivate participants and allow them to perform their tasks as they would in the real world. GRA

N84-27438# Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.
A PLAYER'S MANUAL FOR A COMPLEX DISASTER DECISION SIMULATION
R. M. Pogash, S. C. Streufert, A. L. Denson, and S. Streufert Jan. 1984 126 p
(Contract N00014-80-C-0581)
(AD-A140776; TR-17-ONR) Avail: NTIS HC A07/MF A01 CSCL 09/2

This technical report contains the participant's manuals for a complex micro-computer assisted experimental decision making simulation which may be used to assess decision making characteristics (fifteen or more computer scored measures of performance quantity and quality such as use of strategy and decision coordination) of individuals or teams. The scenario is geared to a disaster event but may be modified to fit any complex decision environment. The system was to provide an experimentally controlled and highly complex (real world like) decision making task that would permit (1) the application of various independent variables, (2) variable manipulation across time segments for within data analyses, (3) the simultaneous application of a variety of stressor variables, where useful, (4) the measurement of physiological (noninvasive) responsivity to task stress in complex tasks, (5) the measurement of the a host of performance variables, with particular emphasis on structural (information to decision processing) characteristics, and (6) the measurement of social and organizational stressor impacts such as task satisfaction and task enjoyment. GRA

N84-27439# National Defense Univ., Washington, D. C.
COHESION IN THE US MILITARY
J. H. Johns, M. D. Bickel, A. C. Blades, J. B. Creel, and W. S. Gatling 1984 120 p
(AD-A140828) Avail: NTIS HC A06/MF A01 CSCL 05/10

In the aftermath of the Vietnam war, a number of military analysts have commented on the apparent deterioration of unit morale and cohesion during the latter stages of that conflict. While other analysts have disputed that conclusion, there is a rather widespread view among military professionals that cohesion was a problem. This study was designed to do several things that are necessary if the cohesion issue is to receive the systematic study it needs. First, to develop a conceptual framework that would identify the principal components of military cohesion. Second, analyze the major systemic, macro variables we believed to be causatively related to the intervening factors of leader behavior and organizational culture. Third, focus a great deal of the effort on the Officers Corps, which is believed to be the key organizational element with respect to cohesion. The conclusion and recommendations in this study are targeted for decisionmakers in the Pentagon, OMB, and Congress. GRA

N84-27440# Perceptronics, Inc., Woodland Hills, Calif.
INTEGRATING RESEARCH ON PERCEIVED AND ACCEPTABLE RISK WITHIN THE PSYCHOMETRIC PARADIGM Final Report
Oct. 1983 27 p
(Contract N00014-80-C-0780)
(AD-A140833; PFTR-1098-83-10) Avail: NTIS HC A03/MF A01 CSCL 05/10

Research on perceived and acceptable risk has two main objectives. One is to develop an understanding of the fundamental laws governing individuals' perceptions and their behaviors in situations of risk. The second is to help individuals and society make better decisions about risks. A major approach to the study of perceived and acceptable risk has employed psychophysical scaling methods nd multivariate analysis to produce quantitative representations of people's attitudes and perceptions. The specific goals of this project were to: develop an integrated perspective on current research within the psychometric paradigm; identify the consistent substantive conclusions emerging from current and past research; enhance the effectiveness of current research programs; set the stage for better communication and increased collaboration among researchers in the future; and identify future research needs and establish priorities for future research. The focal point of the project was a workshop held in Eugene, Oregon on December 11-13, 1980, which brought researchers in this field together for intensive discussions of key methodological and substantive issues in risk perception research. GRA

N84-27441 Claremont Graduate School, Calif.
MOTIVATION AND WORK PERFORMANCE: A COMPARATIVE AND ANALYTICAL STUDY Ph.D. Thesis
Parvin Ghanouni 1984 259 p
Avail: Univ. Microfilms Order No. DA8407453

The topic of motivation and work performance in organizations has received increased attention in recent years among practicing managers and organizational researchers. Several major theories of motivation and related organizational factors were analyzed in a comparative fashion, and then integrated with research and practical applications. The implications of managerial practice in dealing with motivation in organizational settings were considered. In the course of four major discussions, motivation was defined and its importance to organizations was stressed. Motivation theories were reviewed, and the managerial applications suggested by these theories were discussed. The relationship of motivation to the broader concerns of organizational behavior was emphasized. Knowledge concerning the role of motivation in an organizational setting was reviewed, analyzed and compared.
Dissert. Abstr.

N84-27398# Joint Publications Research Service, Arlington, Va.
PHYSIOLOGICAL ASSESSMENT OF CAPACITY FOR PROCESSING INCREASING AMOUNTS OF VISUAL INFORMATION BY HUMAN OPERATORS Abstract Only
V. V. Gorbunov, N. V. Makarenko, and V. V. Dosychev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 37 Transl. into ENGLISH from Zh. Vyssh. Nervnoy Deyatelnosti (Moscow), v. 33, no. 6, Nov. - Dec. 1983 p 1028-1033 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27423# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Hamburg (West Germany). Abt. Flugpsychologie.
THE RELATIONSHIP BETWEEN PERSONALITY AND EFFICIENCY [UEBER DEN ZUSAMMENHANG ZWISCHEN PERSOENLICHKEIT UND LEISTUNG]
Konrad Steininger *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 57-66 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

N84-27424# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Weltraummedizin.
CARDIOVASCULAR REACTIONS ON ORTHOSTASIS AND WEIGHTLESSNESS [HERZ-KREISLAUFREAKTIONEN BEI ORTHOSTASE UND SCHWERELOSIGKEIT]
Friedhelm Baisch *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 67-85 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N84-27442# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
DESIGN AND ANALYSIS OF A LONGITUDINAL RIDE COMFORT CONTROL SYSTEM FOR A SHORT TAKE-OFF AND LANDING (STOL) AIRCRAFT
Andre Lanouette Apr. 1984 69 p refs
(UTIAS-TN-254; ISSN-0082-5263) Avail: NTIS HC A04/MF A01

The application of Active Controls Technology to Short Take Off and Landing aircraft is investigated. The investigation is restricted to a longitudinal ride comfort control system. A typical STOL aircraft is modelled as well as an altitude hold autopilot to provide a comparison for the study. Etkin's four point model for response to turbulence with a Von Karman spectrum is used as turbulence model in the performance analysis. Optimal control theory is used to design an optimal altitude hold autopilot for the aircraft. Using this control system a 98 percent reduction in load factor is achieved. As a consequence of this improvement, the wing root bending moment due to turbulence is reduced to 20 percent of its original value. M.A.C.

N84-27443# Army Aeromedical Research Lab., Fort Rucker, Ala.
IN-FLIGHT EVALUATION OF 2 MOLECULAR SIEVE OXYGEN CONCENTRATION SYSTEMS IN US ARMY AIRCRAFT (JUH-1H AND JU-21G) Final Report
W. Chaffin, Jr., B. F. Hiott, and F. S. Knox, III Mar. 1984 43 p
(DA Proj. 3E1-62777-A-878)
(AD-A140634; USAARL-84-6) Avail: NTIS HC A03/MF A01 CSCL 06/11

The logistical problems associated with using high pressure gaseous oxygen systems have encouraged the development of molecular sieve oxygen concentration systems for use on board aircraft. This report summarizes the in-flight static performance characteristics of two such oxygen concentrators installed in a JU-21G fixed-wing, twin-engine turbopropeller aircraft and a JUH-1H turbine-powered helicopter. Flight profiles consisting of five separate flights at altitudes of 1,524, 3,048, 4,572, 6,096, and 7,620 meters (5,000, 10,000, 15,000, 20,000, and 25,000 feet) were flown in the JU-21G and five separate flights at altitudes of 1,524, 3,048 and 4,572 meters were flown in the JUH-1H. Oxygen concentration at flows of 15, 25, 35, and 70 liters per minute were recorded at each altitude. These flows were chosen to represent normal breathing requirements for one- and two-man crews. In all cases, the concentrators met or exceeded the requirements of MIL-R-83178. The use of engine bleed air to drive the oxygen concentrators produced no noticeable effect on aircraft performance. Author (GRA)

N84-27444# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DISPLAY-CONTROL COMPATIBILITY IN 3-D DISPLAYS Final Report, 1 Jul. 1980 - 31 Dec. 1983
A. W. F. Huggins and D. J. Getty 29 Feb. 1984 29 p
(Contract N00014-80-C-0750; RR0-4209)
(AD-A140640; BBN-5584) Avail: NTIS HC A03/MF A01 CSCL 06/16

This research program explored human perceptual performance as influenced by display-control compatibility with a volumetric 3-D display technique. The work was organized into three phases. In the first, we studied how the speed and accuracy of the operator's decisions about the orientation of a displayed object (a cube) was affected as this orientation was varied relative to that of a fixed control (a cubical response box). In the second, we studied how accurately the observer can perceive and project a trajectory presented within the display, as a function of the trajectory's orientation. In the third phase, we used a real-time control task to measure directly the relative utility of the three dimensions of the display. Author (GRA)

N84-27445# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
TESTING AND CONTROL OF A COMPLIANT WRIST
M. R. Cutkosky, J. M. Jourdain, and P. K. Wright 9 Mar. 1984 29 p
(AD-A140842; CMU-RI-TR-84-4) Avail: NTIS HC A03/MF A01 CSCL 13/9

This report summarizes the evaluation of a controllable, instrumented compliant wrist. The design of the wrist and the concept of a remote center of compliance (RCC) have been described in an earlier report. The wrist is mounted on a large industrial robot used to load precisely machined parts into jigs and fixtures on computer controlled machine tools. The robot and the machine tools form part of an automated cell in which machined parts can be produced with a minimum of human intervention. Loading parts into machine tools is essentially an assembly operation in which the parts are slid into clamps or fixtures and for this reason the RCC techniques that have been developed for assembly robots can also be applied to a machining cell. GRA

N84-27446# Georgia Inst. of Tech., Atlanta. School of Industrial and Systems Engineering.
A MODEL OF HUMAN PROBLEM SOLVING IN DYNAMIC ENVIRONMENTS M.S. Thesis
A. E. Knaeuper Aug. 1983 73 p
(AD-A140862; Rept-83-3) Avail: NTIS HC A04/MF A01 CSCL 05/8

The increased use of automation in aircraft, ships, process plants, transportation networks, and other large-scale systems is changing the human's role in such systems. The manual activities of the human operator are increasingly supplanted by monitoring of automation and occasional problem solving activities. This thesis focuses on these problem solving activities. Models of human problem solving are reviewed, with emphasis on those applicable to situations involving human-machine interaction in detecting, diagnosing, and compensation for system failures. From this review it emerges that most models developed thus far focus on a single aspect of problem solving. An overall model is presented, which considers the full breadth and robustness of human problem solving behavior in dynamic environments. A realization of the general structure of this model within a particular rule-based computer program is discussed. Results are presented from applying this program to modeling human problem solving in a process control task. Author (GRA)

N84-27447# Los Alamos Scientific Lab., N. Mex. Industrial Hygiene Group.
EVALUATION OF PROPOSED HUMAN SUBJECT CERTIFICATION TESTS FOR SELF-CONTAINED BREATHING APPARATUS Progress Report, 1 Aug. 1980 - 30 Oct. 1982
J. Frederick Stampfer, Alan L. Hack, and Andres Trujillo Mar. 1983 57 p refs
(Contracts DI-BM-J0100068; W-7405-eng-36)
(PB84-172212; BM-OFR-48-84) Avail: NTIS HC A04/MF A01 CSCL 06J

A series of human subject certification tests for self-contained breathing apparatus (SCBA) are proposed. The major conclusions derived during this study are: (1) The proposed tests are not too physically demanding. (2) There should be a minimum test subject weight. (3) The important apparatus variables to be measured are breathing resistance, temperature, and CO2 and O2 concentrations of the inhale gas. (4) Continuous monitoring should be employed. (5) New pass-fail criteria based on realistic estimates of the physiological requirements of the user, tempered by present and future engineering limitations, are needed. (6) Breathing machines should be used for the majority of certification testing. (7) A more realistic ergonomics test is needed. (8) System gas leak and facepiece leakage tests are also needed. GRA

N84-26592# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
ESTIMATING DETECTION RANGE AND RANGE LOSS LOOKING THROUGH WINDSHIELDS AND HEAD-UP DISPLAYS

H. C. Self *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 31-54 (For primary document see N84-26587 17-01)
(AD-P003161) Avail: NTIS HC A05/MF A01 CSCL 06/16

N84-26593# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
DIRECT PERFORMANCE ASSESSMENT OF HUD (HEAD-UP DISPLAY) DISPLAY SYSTEMS USING CONTRAST SENSITIVITY
A. P. Ginsburg *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 55-66 (For primary document see N84-26587 17-01)
(AD-P003162) Avail: NTIS HC A05/MF A01 CSCL 01/3

N84-26634# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
VISUAL EFFECTS OF F-16 CANOPY/HUD (HEAD-UP DISPLAY) INTEGRATION
L. V. Genco *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 793-807 (For primary document see N84-26596 17-01)
(AD-P003221) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26941# Joint Publications Research Service, Arlington, Va.
EVALUATION OF ENERGY CHARACTERISTICS OF BIPEDAL WALKING AND RUNNING BY MODEL ANALYSIS Abstract Only
V. V. Veletskiy and Yu. V. Bolotin *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 41 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 89-94 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26942# Joint Publications Research Service, Arlington, Va.
TREATMENT OF WALKING AS CONTROLLABLE SELF-EXCITED OSCILLATIONS Abstract Only
Yu. I. Neymark *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 41-42 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 81-88 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-27399# Joint Publications Research Service, Arlington, Va.
BIOFEEDBACK METHODS AND QUALITY OF OPERATOR'S PERFORMANCE Abstract Only
M. V. Frolov, V. A. Glazkova, and L. S. Khachaturyants *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 38 Transl. into ENGLISH from Psikhologicheskiy Zh. (Moscow), v. 5, no. 2, Mar. - Apr. 1984 p 85-91 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27414# Joint Publications Research Service, Arlington, Va.
POSSIBILITIES OF CREATING INVARIANT MAN-MACHINE SYSTEMS Abstract Only
V. G. Zazykin *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) 22 Jun. 1984 p 91-92 Transl. into ENGLISH from Psikhologicheskiy Zh. (Moscow), v. 5, no. 2, Mar. - Apr. 1984 p 76-84 (For primary document see N84-27397 17-51)
Avail: NTIS HC A07/MF A01

N84-27422# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Flugphysiologie.
MODELS FOR THE EVALUATION OF WORK LOADS OF CREWS DURING LONG DISTANCE FLIGHT [MODELLE ZUR BEURTEILUNG DER BELASTUNG VON FLUGBESATZUNGEN AUF LANGSTRECKENFLUEGEN]
Hans Martin Wegmenn *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. Oct. 1983 p 45-56 refs In GERMAN (For primary document see N84-27418 17-52)
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N84-27448*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CARE 3: HANDS-ON DEMONSTRATION AND TUTORIAL
S. J. Bavuso, J. E. Brunelle, and P. L. Petersen (Kentron International, Inc., Hampton, Va.) May 1984 252 p refs
(NASA-TM-85811; NAS 1.15:85811) Avail: NTIS HC A12/MF A01 CSCL 12A

The salient CARE III features are illustrated by describing and analyzing eight example problems. The CARE III user friendly interface is illustrated for several example problems and CARE III output data describing the reliability assessment of each system is given. Author

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N84-27449# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MICROCOMPUTER AND MYTHOLOGY: PROCRUSTEAN ASSIGNMENTS [MICROCOMPUTADOR E MITOLOGIA: AS INSTRUCOES PROCRUSTIANAS]
Daniel J. R. Nordemann Feb. 1984 5 p ref In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-3012-PRE/455) Avail: NTIS HC A02/MF A01

The author explains the origin of the expression procrustean instruction (Sinclair TS1000 User Manual). Author

N84-27450# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
WHERE AND HOW VARIABLES ARE STRUCTURED IN THE ZX81/TS1000/ TK82C/CP200 MEMORY [ONDE E COMOSAO ARMAZENADAS AS VARIAVEIS NA MEMORIA DO ZX81/ TS1000/TK82C/CP200]
Daniel J. R. Nordemann Feb. 1984 11 p ref In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-3014-PRE/457) Avail: NTIS HC A02/MF A01

The structure of the various kinds of variables within the memory of the Sinclair ZX81 family microcomputers is described. The structure of numerical data as five bytes within numerical variables is also described. A few short program examples are given to help understand the given explanations. Author

N84-27451# Yale Univ., New Haven, Conn. Dept. of Computer Science.
A HIGH PERFORMANCE BULK MEMORY SYSTEM Research Report
W. Gropp, J. J. ODonnell, S. T. ODonnell, M. H. Schultz, and B. Weston Mar. 1984 11 p
(Contract N00014-82-K-0184; Grant NSF MCS-81-06181)
(AD-A140780; YALEU/DCS/RR-311) Avail: NTIS HC A02/MF A01 CSCL 09/2

We need a significant improvement in the technology of

secondary memories. A bulk memory system with inexpensive memory doing fetches or writes in parallel (interleaving) provides one such technology. This interleaving is perfect for scientific computing in which one can usually design algorithms so that one need only access very long vectors in auxiliary storage. In these applications the effectiveness of the bulk memory is determined by the transfer rate. However, the bulk memory is even better suited for those problems, for example, as arise in commercial data processing, data base, and artificial intelligence applications, in which we wish to transfer small amounts of data. It is determined not by the transfer rate but by the latency and access time. In order to test the validity of our thesis, we have developed a bulk memory secondary storage device for a general-purpose supercomputer, the Floating Point Systems FPS-164. We present an overview of this system in Section 2. In Section 3, we describe the design philosophy of the interface to the FPS-164. To simplify the use of the bulk memory system, we have written a software system for the bulk memory which emulates a disk. This enables the user to use application software written to do I/O on a system with a peripheral disk virtually unchanged. We present the details of our software design in Section 4. The FPS-164 is a moderately priced, fast central processing unit with fast I/O ports. While array processors such as the FPS-164 have traditionally been used for engineering and scientific computations, we feel the lessons we learn with this system will carry over to the applications and other high performance computers. GRA

N84-27452# Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.
THE PRINGLE PARALLEL COMPUTER Interim Technical Report
A. A. Kapauau, J. T. Field, D. B. Gannon, and L. Snyder (Washington Univ., Seattle) Apr. 1984 13 p
(Contracts N00014-80-K-0816; N00014-81-K-0360)
(AD-A140852; TR-84-04-01) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Pringle is a 64 processor MIMD computer with a 64 M (8 bit) instructions per second execution rate. The Pringle runs programs written for the Configurable, Highly Parallel (CHiP) Computer. That is, the Pringle executes the 64 separate instruction streams as well as the interconnection (phase) stream that configures the lattice of 64 processor CHiP computer. But the Pringle is not a CHiP. It gives the illusion of the CHiP machine's conflict-free, point-to-point communication using a 64 Mbit internal polled bus. In addition to describing the design goals and the Pringle architecture, this paper identifies two problems common to novel architecture implementation projects, the wisdom of experience problem and the single instance problem, and explains how these were addressed for the Pringle. Author (GRA)

N84-27453# Naval Postgraduate School, Monterey, Calif.
THE IMPLEMENTATION OF A MULTI-BACKEND DATABASE SYSTEM (MDBS). PART 4: THE REVISED CONCURRENCY CONTROL AND DIRECTORY MANAGEMENT PROCESSES AND THE REVISED DEFINITIONS OF INTER-PROCESS AND INTER-COMPUTER MESSAGES
S. A. Demurjian, D. K. Hsiao, D. S. Kerr, and A. Orooji Feb. 1984 30 p
(AD-A140874; AD-E500637; NPS52-84-005) Avail: NTIS HC A03/MF A01 CSCL 09/2

The multi-backend database system (MDBS) uses one minicomputer as the master or controller, and a varying number of minicomputers and their disks as slaves or backends. MDBS is primarily designed to provide for database growth and performance enhancement by the addition of identical backends. No special hardware is required. The backends are configured in a parallel manner. A new backend may be added by replicating the existing software on the new backend. No new programming or reprogramming is required. A prototype MDBS is being completed in order to carry out the design verification and performance evaluation. This report is the fourth in a series which describes the MDBS implementation. The processes in the MDBS controller (request preparation, insert information generation and post processing) and the processes in the MDBS backends (directory management, record processing and concurrency control) have been described in the previous reports. The concurrency control process, formerly used to control access to just user data, is modified to control access to directory data as well. The directory management process is also modified to improve the execution of update requests. Finally, a directory management is modified for the storage of directory data on the secondary storage. Next, the report describes the revised definitions of inter-process messages (messages between processes within a minicomputer) and intercomputer messages (messages between processes in different minicomputers). Finally, we conclude this series of reports dealing with the implementation of MDBS. GRA

N84-27454# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
IMPLEMENTATION OF CELLULAR-LOGIC OPERATORS USING 3 X 3 CONVOLUTION AND TABLE LOOK-UP HARDWARE
F. A. Gerritsen and P. W. Verbeek (Technische Hogeschool, Delft) 17 Jun. 1983 24 p refs Presented at SPIE Conf. Geneva, 18-22 Apr. 1983 Submitted for publication
(NLR-MP-83039-U) Avail: NTIS HC A02/MF A01

Cellular-logic operations such as erosion, dilation, contour extraction skeletonization, local majority voting and pepper-and-salt noise removal in processing binary images are discussed. It is shown that cellular-logic operations, e.g., homomorphic filters, can be constructed from a 3 x 3 convolution and a nonlinear table look-up. The method extends the field of application of image-processing systems from enhancement and other pre-processing of gray-valued images to the processing and measurement of objects in the segmented image. Author (ESA)

N84-27455# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
ON TWO-TAPE REAL TIME COMPUTATION AND QUEUES
Paul M. B. Vitanyi Dec. 1983 10 p refs Revised Submitted for publication
(MC-IW-246/83; B8465125) Avail: NTIS HC A02/MF A01

It is suggested that a two-head tape unit is more powerful in real time than two one head tape units. It is shown that two one head tape units can not both simulate a queue in real time and keep the minimum of the distances of the scanned tape squares to the start squares of size o(n). That is, information which initially was stored near the start squares may have to be transported to a disjoint set of tape squares (while new incoming data has to be stored) to be real time reproducible in first in first out order. A two head tape unit can trivially simulate a queue in real time while not having to shift data at all. Author (ESA)

N84-27456# SoHaR, Inc., Los Angeles, Calif.
MICROCOMPUTERS: INTRODUCTION TO FEATURES AND USES Final Report
Myron Hecht, Herbert Hecht, and Laurence Press Mar. 1984 148 p refs
(Grant NB82SB-C-A1654)
(PB84-178821; NBS-SP-500-110; LC-84-601005) Avail: NTIS HC A07/MF A01 CSCL 09B

Microcomputers and their uses in the Federal government are examined. Basic concepts in microcomputers are discussed, and their uses by clerical, administrative, professional, and technical Federal personnel are described. The motivations costs, and risks of microcomputer use are identified, and recommendations for successful implementations are provided. Appendices contain a glossary and annotated bibliography. GRA

N84-27457 State Univ. of New York, Stony Brook.
THE IMPACT OF COMMUNICATING THROUGH COMPUTERS Ph.D. Thesis
Sharon Lynne Murrel 1983 159 p
Avail: Univ. Microfilms Order No. DA8405379

The impact of two synchronous approaches is examined which vary in the role of immediacy of interaction and feedback, on idea generation and group decision making. One system is message

oriented, requiring a conferee to complete a message before interacting with others. The other displays what each group member is typing in a separate window on the screens of all participants so that users can comment on ideas as they are expressed. While the differential ability to interact did not influence brainstorming performance, it did influence the ability of groups to produce quality decisions. Groups interacting through either of the communication systems generated fewer ideas than the same number of people working individually on three of those problems. Window system groups both improved more and produced significantly higher quality decisions than message system groups.
Dissert. Abstr.

N84-26854# Joint Publications Research Service, Arlington, Va.
MICROPROCESSOR PARALLEL PROCESSING FOR DIGITAL FILTERS Abstract Only
A. D. Sotnikov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 26 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Priborostr. (Leningrad), v. 27, no. 7, Jul. 1983 p 37-41 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26855# Joint Publications Research Service, Arlington, Va.
IMPROVEMENT IN ANALOG ERROR AUTOCORRECTION CIRCUIT Abstract Only
R. I. Grushvitskiy, B. A. Manchev, and A. Kh. Mursayev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 26 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Priborostr. (Leningrad), v. 26, no. 7, Jul. 1983 p 42-46 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26856# Joint Publications Research Service, Arlington, Va.
PECULIARITIES OF MINIMIZATION OF MIXER NOISE FACTOR Abstract Only
Ye. N. Anisimov and B. A. Astashkevich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 27 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2266-2272 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26892# Joint Publications Research Service, Arlington, Va.
SIEMENS PLANS 256 K MEMORY CHIP TO CATCH UP WITH JAPAN
Ulf Peter Hellstrom *In its* West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 38-40 refs Transl. into ENGLISH from Aftenposten (Oslo), 19 Mar. 1984 p 27 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

N84-26893# Joint Publications Research Service, Arlington, Va.
SIEMENS STRATEGY INCLUDES DM 1 BILLION FOR SUBMICRONS IC'S
In its West Europe Rept.: Sci. and Technol. (JPRS-WST-84-018) 4 Jun. 1984 p 41-42 refs Transl. into ENGLISH from Handelsblatt (Dusseldorf), 6-7 Apr. 1984 p 17 (For primary document see N84-26888 17-31)
Avail: NTIS HC A04/MF A01

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N84-27458 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
TUTORIAL MATERIAL ON THE REAL DATA TYPES IN ADA Final Report
B. A. Wichmann (European Research Office, London) Jan. 1984 108 p refs
(Contract DAJA45-83-M-0264)
(NFL-DITC-34/83; ISSN-0262-5369) Copyright. Avail: Issuing Activity

Ada programming language numeric features are outlined, with exercises, for programs familiar with numerical computation but not with Ada. Fixed and floating point; notation for literals; a model of approximate computation; universal expressions; tools for the investigation of numerical accuracy; complex data types; and portability issues are covered. Author (ESA)

N84-27459 Gesellschaft fuer Mathematik und Datenverarbeitung, Bonn (West Germany).
SOFTWARE DEVELOPMENT BASED ON MULTIGRID TECHNIQUES
Klaus Stueben, Ulrich Trottenberg, and Kristian Witsch Feb. 1984 28 p refs Presented at IFIP TC2 Working Conf. on PDE Software: Modules, Interfaces and Systems, Soederkoeping, Sweden, 1983 (GMD-84; ISSN-0723-0508) Copyright. Avail: Issuing Activity

The existence of natural (technical and/or more fundamental) design requirements inherent to efficient multigrid software is considered. The development of highly efficient codes for special scalar second order elliptic equations, and writing a black box program for the solution of a large class of sparse linear systems, based on the algebraic multigrid approach are described. It is argued that the influence of the different objectives on the design of these codes is much stronger than the fact that they are based on the multigrid principle. Author (ESA)

N84-27460*# Hawaii Univ., Honolulu. Dept. of Electrical Engineering.
BCH CODES FOR LARGE IC RANDOM-ACCESS MEMORY SYSTEMS Final Report
Shu Lin and Daniel J. Costello, Jr. (Illinois Inst. of Technology) Jun. 1983 28 p refs
(Contract NAG2-202)
(NASA-CR-166549; NAS 1.26:166549) Avail: NTIS HC A03/MF A01 CSCL 09B

In this report some shortened BCH codes for possible applications to large IC random-access memory systems are presented. These codes are given by their parity-check matrices. Encoding and decoding of these codes are discussed. B.W.

N84-27461*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STABCAR: A PROGRAM FOR FINDING CHARACTERISTIC ROOT SYSTEMS HAVING TRANSCENDENTAL STABILITY MATRICES
William M. Adams, Jr., Sherwood H. Tiffany, Jerry R. Newsom, and Ellwood L. Peele Jun. 1984 144 p refs
(NASA-TP-2165; L-14861; NAS 1.60:2165) Avail: NTIS HC A07/MF A01 CSCL 09B

STABCAR can be used to determine the characteristic roots of flexible, actively controlled aircraft, including the effects of unsteady aerodynamics. A modal formulation and a transfer-matrix representation of the control system are employed. Operable in either a batch or an interactive mode, STABCAR can provide graphical or tabular output of the variation of the roots with velocity, density, altitude, dynamic pressure or feedback gains. Herein the mathematical model, program structure, input requirements, output capabilities, and a series of sample cases are detailed. STABCAR was written for use on CDC CYBER 175 equipment; modification would be required for operation on other machines. Author

N84-27462# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A FAST INTERPOLATOR WITH SLOPE SPECIFICATION [UM INTERPOLADOR RAPIDO COM ESPECIFICACAO DAS INCLINACOES]
Jose Antonio Goncalves Pereira and Nandamudi Lankalapalli Vijaykumar Apr. 1984 6 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Congr. SBC Seminario Integrado

de Software e Hardware, 21-27 Jul., 1984, Vicosa, Brazil
(INPE-3058-PRE/478) Avail: NTIS HC A02/MF A01

An interpolation algorithm, which is fast, easy and simple to be implemented, besides smooth in each interval, is shown. A 5th degree polynomial is used and the first and the second derivatives are guaranteed. Another algorithm which makes slope specifications possible is also proposed as this is important in some applications. The computational effort is very small and increases linearly with the number of points to be interpolated. Author

N84-27463# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A PROPOSAL FOR THE EXTENSION OF THE LISP LANGUAGE [GRASP; UMA PROPOSTA PARA EXTENSAO DO LISP]
Guilherme Bittencourt Apr. 1984 6 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Congr. SBC, Seminario Integrado de Software e Hardware, 21-27 Jul. 1984, Vicosa, Brazil
(INPE-3056-PRE/476) Avail: NTIS HC A02/MF A01

A proposal of the LISP language extension centered in GRAPH manipulation is described. A GRAPH representation inside the LISP structure, as well as functions able to create, modify and manipulate GRAPHS are proposed. The execution police for GRAPHS considered as instructions set are described. Finally, some applications of this proposal are described. Author

N84-27464# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AUTOMATIC IMAGE PROCESSING [TRATAMENTO AUTOMATICO DE IMAGENS]
Marx Prestes Barbosa Feb. 1984 53 p refs In PORTUGUESE; ENGLISH summary
(INPE-3001-MD/024) Avail: NTIS HC A04/MF A01

The objective of the automatic processing of digital imagery is to aid the user in the extraction and interpretation of information from the imagery. An overview of such a system is presented. Radiometric and atmospheric correction, contrast augmentation, pattern classification, image enhancement, and noise elimination capabilities are described. M.G.

N84-27465# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STATIC ANALYZER OF FORTRAN PROGRAMS M.S. Thesis [UM ANALISADOR ESTATICO DE PROGRAMAS FORTRAN]
Clovis Torres Fernandes Mar. 1984 139 p refs In PORTUGUESE; ENGLISH summary
(INPE-3016-TDL/155) Avail: NTIS HC A07/MF A01

The development and implementation of a static analyzer of programs is discussed. The purpose of this analysis is: (1) to detect anomalies in the data flow of a program; (2) to produce complexity measures which evaluate the difficulty in program understanding, operation and maintenance; (3) to produce documentation such as crossed reference, subroutine call graph, etc. The system, named DADIVA, is implemented in FORTRAN ANS/66 and can be used to analyze programs written in FORTRAN ANS/66. Author

N84-27466# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
BRINGING TOGETHER VARIOUS PROGRAMS AND DATA PACKETS IN THE ZX81/TS1000/TK82C/CP200 MEMORY [REUNIAO DE VARIOS PROGRAMAS E PACOTES DE DADOS NA MEMORIA DO ZX81/TS1000/TK82C/CP200]
Daniel J. R. Nordemann Feb. 1984 16 p In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-3013-PRE/456) Avail: NTIS HC A02/MF A01

Various ways to transfer data blocks from one place to another within the memory of the Sinclair ZX81 family microcomputer are described. The structure of program lines is described and also the modifications of this structure. A protected zone between 118 118 and D FILE may be created and used for the transfer of programs from above RAMTOP. Several simple programs are given as an example to be used as an equivalent of the MERGE functions applied to different programs. Author

N84-27467# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DATA SMOOTHING: AN AUTOMATIC ALGORITHM [SUAVIZACAO DE DADOS - UM ALGORITMO AUTOMATICO]
Robert Vieira daFonsecaLopes Mar. 1984 35 p refs In PORTUGUESE; ENGLISH summary Presented at the 5th Congr. Nacl. de Mat. Aplicada e Computacional, Sao Jose Dos Campos, Brazil, 26-30 Sep. 1983
(INPE-3034-PRE/468) Avail: NTIS HC A03/MF A01

Some smoothing methods useful for preprocessing noisy data and other applications are presented. Particularly, the second order differences and derivative minimization methods are formulated. Afterwards a criterion to choose the degree of smoothing is proposed which is utilized in implementing these methods. Then an automatic procedure to calculate that parameter based on a stochastic model of the data noise is developed. The performance of the algorithm can be verified by means of results obtained from digital computer simulation tests which are presented and discussed. Author

N84-27468# Naval Postgraduate School, Monterey, Calif.
HP-41C PROGRAMS AND INSTRUCTIONS FOR PROBABILITY AND STATISTICS
P. W. Zehna Feb. 1984 113 p
(AD-A140573; NPS55-84-003) Avail: NTIS HC A06/MF A01 CSCL 09/2

The purpose of this report is to make available a set of programs and the corresponding user instructions so that the problem material found in the writer's textbooks, Probability by Calculator and Statistics by Calculator, may be resolved using the HP-41C hand held calculator. GRA

N84-27469# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
DYNAMIC MODULE REPLACEMENT IN A DISTRIBUTED PROGRAMMING SYSTEM Ph.D. Thesis
T. Bloom Mar. 1983 138 p
(Contract N00014-75-C-0661)
(AD-A140619; MIT/LCS/TM-303) Avail: NTIS HC A07/MF A01 CSCL 09/2

The replacement of parts of software systems is an important aspect of programming methodology. Most of the research in this area has centered around support for modular construction and the clear separation of interface from implementation. The emphasis has been on producing easily modified static program structures. In the context of the Argus programming system, we examine a method of supporting dynamic modification of software for this class of applications. We determine the appropriate granularity of replacement in relation to the module structure of the language, examine the constraints imposed on dynamic replacement by the need to ensure behavioral consistency across replacements, and then analyze functional requirements for a replacement mechanism. GRA

N84-27470# Naval Postgraduate School, Monterey, Calif.
DESIGN OF AN INTEGRATED SOFTWARE SYSTEM BASED ON THE RELATIONAL DATA BASE MODEL M.S. Thesis
P. J. Harrison and G. L. Thompson Dec. 1983 176 p
(AD-A140628) Avail: NTIS HC A09/MF A01 CSCL 05/1

Integration of application programs into a single system has become increasingly important as the workstation environment moves toward uniformity for easier learning and use. This thesis proposes an Integrated Software System (ISS) based on the Relational Database model as a suitable basis for integrating five common applications found in a business office. Relations, or tables, are defined as the common data objects and it is shown how they are used to support each logical application. Operations based on relational algebra are defined which extend the functions of ISS beyond the aggregate of the five chosen applications. A simple graphical user interface is designed for the kernel of the

system and a design for a kernel prototype using a Unix environment is presented. Author (GRA)

N84-27471# Softech, Inc., Waltham, Mass.
ADA (TRADEMARK) PRIMER
Jan. 1984 349 p
(Contract DAAB07-83-C-K514)
(AD-A140660; AD-E401166) Avail: NTIS HC A15/MF A01 CSCL 05/9

Ada is a high order language (HOL) developed by the Department of Defense (DoD) to be used in programming embedded systems. It is anticipated that use of Ada will significantly reduce the costs associated with defense software by providing more maintainable code. One of the goals of this workbook is to illustrate how to use the features of the Ada language to help produce moore maintainable code. Ada Primer is the first of a series of three workbooks. This workbook may be used in conjunction with module L202, Basic Ada Programming. A student, having completed L202 in conjunction with this workbook, shall be able to use an Ada package and code Ada subprograms using the Pascal subset of Ada. With the exception of Section 1 of this workbook, each workbook is organized as a series of Ada exercises to be solved by the reader. Taken sequentially as presented in the workbook, the exercises expose the student to the features of Ada in a logical fashion. This workbook is intended for those individuals who have either a Bachelor's Degree in one of the sciences (with Computer Science courses included) an Associate in Arts Degree in Computer Science, or a strong background in high order languages such as PASCAL, FORTRAN, JOVIAL, or CMS-2. GRA

N84-27472# Naval Postgraduate School, Monterey, Calif.
PROJMNG FORTRAN: AN INTERACTIVE COMPUTER PROGRAM FOR USE WITH THE DEFENSE MANAGEMENT SIMULATION EXERCISE M.S. Thesis
G. W. Schultz Mar. 1984 324 p
(AD-A140709) Avail: NTIS HC A14/MF A01 CSCL 09/2

Contact Negotiation Package (CNP), the supporting computer program for the Defense Management Simulation, is revised and embedded into a program which makes it user-friendly, and which provides sensitivity analysis capability to it. The program includes a plotting function for the sensitivity analysis. Exercise records are established for review of contracting team performance. Database files are generated which permit teams to submit reports, which provide a baseline for subsequent game sessions, and which permit monitor evaluation of team progress. The text provides a description for the operation of both CNP and PROJMING. It documents the new program, PROJMNG. Appendices include the FORTRAN code, and Conversational Monitor System executive machine language programs for the new programs operation. It contains instruction manuals which depict operation for both programs. Author (GRA)

N84-27473# PEL, Inc., Baton Rouge, La.
INTERACTIVE RISK ANALYSIS AND DEVELOPMENT OF STANDARDIZED FACTORS Final Report, 1 Aug. 1983 - 31 Jan. 1984
G. H. Worm Jan. 1984 34 p
(Contract F33615-83-K-5075)
(AD-A140758; BRMC-83-5075) Avail: NTIS HC A03/MF A01 CSCL 09/2

Part I presents a brief description of a computer program which is available to perform calculations needed in a risk analysis. The program allows a user to estimate the risk associated with any number of variables and to display the distribution of any arithmetic (+, -, and/or *) combination of the variables. The mode of operation is designed to be similar to a calculator. Rather than entering in a single number, the user must supply a low, most likely, and high for each variable. Variables can be added, subtracted, or multiplied; intermediate calculations can be stored; and the distribution of the total can be displayed at any time. Part II discussed the development of a microcomputerized statistical price risk analysis model which allows a user to estimate a distribution of total cost using complete 14 objective input. The objective characteristics of a contract which introduces cost risk are identified, and the standardized factors associated with these characteristics are defined and applied to a cost breakdown. The use of standardized factors has several advantages over subjective estimates of risk: the cost risk analysis is objective rather than subjective; estimates of risk are independent of biases and experience; risk analysis results are comparable between contracts; standardized factors provide documentation for the cost risk analysis; oversights are eliminated; and standardized factors allow for the incorporation of many different points of view. GRA

N84-27474# Adaptive Sensors, Inc., Santa Monica, Calif.
MINIMUM-ERROR TRELLIS-PATH DECODERS FOR CONVOLUTIONAL CODES Final Report
I. S. Reed Mar. 1984 22 p
(Contract N00019-83-C-0075)
(AD-A140811) Avail: NTIS HC A02/MF A01 CSCL 09/4

In this final report on a one-year study of syndrome decoding techniques, the results of previous studies are extended and applied to the development of a new class of minimum-error trellis-path decoders for (n, k) convolutional codes. Also, a new method is devised by example for finding the minimum-error trellis path. This promising technique is called piecewise L-step minimum-error decoding. Other more standard decoding methods can also be used to find the minimum-error trellis path, such as a Viterbi-like algorithm and the various sequential decoding techniques. GRA

N84-27475# Softech, Inc., Waltham, Mass.
Ada (TRADEMARK) CASE STUDIES II
Jan. 1984 282 p
(Contracts DAAB07-83-C-K514; DAAK80-81-C-0187)
(AD-A140818) Avail: NTIS HC A13/MF A01 CSCL 09/2

This report presents a set of case studies on different aspects of the Ada language. The work which led to this volume was performed by SofTech, Inc. under the Ada Design Methods Training Support Contract. The objective of this report is threefold: To expand on Ada issues which surfaced in the ASDMF contract cited above to explore new Ada issues to gain insight into the characteristics of a life cycle design methodology that would promote effective use of Ada this report contains fifteen case studies which illustrate different areas of the Ada language: naming conventions; types; coding paradigms; exceptions; and program structure. GRA

N84-27476# Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.
INTRODUCTION TO THE POKER PARALLEL PROGRAMMING ENVIRONMENT Interim Technical Report
L. Snyder Aug. 1983 7 p
(Contracts N00014-80-K-0816; N00014-81-K-0360)
(AD-A140851; CSD-TR-434) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Poker Parallel Programming Environment is a graphics-based, interactive system for programming the Configurable, High Parallel (CHiP) Computer. Designed to support nearly all aspects of parallel programming in one integrated system, Poker has been implemented as a (35,000 line) C program on the VAX 11/780 under UNIX. It provides a number of novel features including graphics programming of parallel processor communication. Author (GRA)

N84-27477# Mitre Corp., Bedford, Mass.
A STUDY OF THE FEASIBILITY OF DUPLICATING JAMPS APPLICATIONS SOFTWARE IN THE Ada PROGRAMMING LANGUAGE Final Technical Report
R. G. Howe Hanscom AFB, Mass. ESD Apr. 1984 87 p
(Contract F19628-84-C-0001)
(AD-A140884; MTR-9167; ESD-TR-84-160) Avail: NTIS HC A05/MF A01 CSCL 09/2

This document is a feasibility study of reimplementing the JAMPS(JINTACCS Automated Message Processing System) applications software using the Ada programming language. Existing JAMPS software is written in "C' language; reimplementa-

tion is under consideration to promote the reusability of the JAMPS software and decrease JAMPS life cycle costs. Ada software development tools for the MC68000 now exist in rudimentary form, but, due to the inadequacy of run time environments and the lack of validated compilers, these tools are inadequate for duplicating JAMPS software at this time. However, the tools are expected to improve sufficiently that reimplementation in Ada might reasonably begin in FY85. Cost estimates result in a $4.5M pricetag; manpower estimates and schedules are also included.
Author (GRA)

N84-27478# Technion - Israel Inst. of Tech., Haifa. Dept. of Computer Science.
DESIGN METHODOLOGY FOR REAL-TIME DISTRIBUTED SYSTEMS Final Technical Report, 1 Jun. 1981 - 31 May 1983
M. Yoeli Griffiss AFB, N.Y. RADC Dec. 1983 41 p
(Grant AF-AFOSR-0152-81; AF Proj. 2304)
(AD-A140886; TR121-597-003; RADC-TR-83-272) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report establishes a methodology for the structured design of complex, real-time digital systems, involving a high degree of concurrency. The design is based on the initial decomposition of the system specification into a control part and a data processing part. Formal models are developed for both parts, and a design methodology closely related to structured programming, is shown to be applicable. The proposed methodology is particularly suitable for precise and concise system requirements specifications as well as for the application of advanced verification methods.
Author (GRA)

N84-27479# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Computer Science.
A SPECIFICATION TECHNIQUE FOR THE COMMON APSE (Ada PROGRAMMING SUPPORT ENVIRONMENTS) INTERFACE SET
T. E. Lindquist, J. L. Facemire, and D. G. Kafura Apr. 1984 41 p
(Contract N00014-83-K-0643)
(AD-A140889; CS84004-R) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report demonstrates an approach to specifying kernel Ada support environment interface components. The objectives are to provide a mechanism which allows building a complete enough specification for validation, an understandable specification, and one that is relatively easy to construct. In meeting these objectives, an Abstract Machine approach has been modified and applied to functional description of kernel operations. After motivating an explaining the approach, the paper exemplifies its utility. Interactions among kernel operations and pragmatic implementation limits, which are other needed parts of a specification, are also discussed.
Author (GRA)

N84-27480# Karlsruhe Univ. (West Germany). Fakultaet fuer Informatik.
DANTE: A SEMANTIC DATA MODEL FOR USE IN THE CONSTRUCTION SECTOR [DANTE: EIN SEMANTISCHES DATENMODELL FUER ANWENDUNGEN AUS DEM KONSTRUKTIONSBEREICH]
Birgit Lueke Sep. 1983 58 p refs In GERMAN
(KU-IB-17/83) Avail: NTIS HC A04/MF A01

The semantic model DANTE was developed in order to provide modeling concepts for the definition of data base schemes for the construction of technical objects. The DANTE basic data model is based on the entity-relationship model. Four types of relationship (three aggregation classes and a specialization class) from which all standard operators start are distinguished. In one of the aggregation classes utilization-specific operators for the construction of examples of this class can be defined. Operators can be designed freely.
Author (ESA)

N84-27481# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
COMPARISON OF SOME SOFTWARE RELIABILITY MODELS FOR SIMULATED AND REAL FAILURE DATA
G. Moek 6 Jun. 1983 16 p refs Presented at 4th International Association of Science and Technology for Development (IASTED) Intern. Symp. and Course on Modeling and Simulation, Lugano, Italy, 21-24 Jun. 1980
(NLR-MP-83032-U) Avail: NTIS HC A02/MF A01

Three software reliability models were selected for application to software failure data obtained in practice. The model parameters are estimated by the maximum likelihood method. Criteria on the data are derived that have to be satisfied in order that bounded estimates for individual model parameters exist. Application to simulated and real failure data shows that none of the models performs significantly better or worse than the others. The estimation results are dependent on the amount of failure data available and on the way the data were obtained.
Author (ESA)

N84-27482# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
A DATA MANAGEMENT AND PRESENTATION TOOL FOR ENGINEERING AND RESEARCH
F. J. Heerema and H. A. Kreijkamp 19 Aug. 1983 14 p refs Presented at the 36th European Control Data Users (ECODU) Conf., Dusseldorf, 12-16 Sep. 1983
(NLR-MP-83044-U) Avail: NTIS HC A02/MF A01

An engineering data management system based on computer aided design techniques was designed and made operational. Database management techniques cope with data transfer. Interactive interrogating of a centralized database, and interactive graphics are applied in the analysis and presentation functions. The system is called the Engineering Data Interactive Presentation and Analysis System.
Author (ESA)

N84-27483# Center for Mathematics and Computer Science, Amsterdam (Netherlands). Dept. of Operations Research and System Theory.
A STUDY OF ELIMINATION CONDITIONS FOR THE PERMUTATION FLOW-SHOP SEQUENCING PROBLEM
J. Han (Academia Sinica, Beijing, China) and M. Yue Jan. 1984 19 p refs
(CWI-OS-R8403) Avail: NTIS HC A02/MF A01

Elimination criteria for the permutation flow-shop problem are given. One of them is proved to be equivalent to Szwarc's elimination criterion. A lower bound to be used in a branch-and-bound method is proposed.
Author (ESA)

N84-27484# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
ON THE DESIGN OF AN EDITOR FOR THE B PROGRAMMING LANGUAGE
Aad Nienhuis Dec. 1983 20 p refs
(MC-IW-248/83; B8465127) Avail: NTIS HC A02/MF A01

The B programming language syntax directed editor conceptual model, user interface, and commands are described. The editor is a screen editor, using focusing to select objects to be changed. Edit commands and pointing commands (which control focus) are separate. Edit commands only affect the focused area, and an undo mechanism can reverse editor actions. Commands widen focus or narrow the focus, and delete, add, insert or copy text. A suggestion mechanism is incorporated.
Author (ESA)

N84-27485# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
ALGEBRA OF COMMUNICATING PROCESSES WITH ABSTRACTION
J. A. Bergstra and J. W. Klop Jan. 1984 47 p refs Submitted for publication
(CWI-CS-R8403; B8465124) Avail: NTIS HC A03/MF A01

An axiom system algebra of communicating processes (ACP tau) for communicating processes with silent actions (tau steps) is presented. The system is an extension of ACP, Milner's tau laws and an explicit abstraction operator. Using a model of finite acyclic process graphs for ACP tau, syntactic properties such as consistency and conservativity over ACP are proved. The expansion

theorem for ACP is shown to carry over to ACP tau. Termination of rewriting terms according to the ACP tau axioms is proved using the method of recursive path orderings. Author (ESA)

N84-27486# ITT Advanced Technology Center, Shelton, Conn.
SOFTWARE PSYCHOLOGY: THE NEED FOR AN INTERDISCIPLINARY PROGRAM
Ruven Brooks, John Black, Bill Curtis, Kate Ehrlich, H. Rudy Ramsey, and Eliot Soloway Mar. 1983 33 p refs Prepared in cooperation with Yale Univ., New Haven, Conn.
(PB84-176718; NSF/OIR-83007) Avail: NTIS HC A03/MF A01 CSCL 05J

Software psychology is defined and differentiated from software engineering, human factors, and ergonomics. Cognitive factors in software development and use are emphasized, and a few achievements in the area of software methodology are examined. Attention is focused on the large individual differences among programmers, and it is pointed out that these differences are related to a number of factors. Breadth of relevant experience is shown to be a better prediction of performance than is length of experience. Problem solving in unstructed domains is addressed and the format of procedural specification is considered. Research on language structures revealed that: (1) structuring the control flow assists programmers in understanding a problem; and (2) the advantage of strongly typed languages is in the enhanced data structures that they support. Connections between programming and text research are explored and trends in computing technology are noted. The need for greater collaboration between computer scientists and psychologists is stressed. GRA

N84-27487# Federal Compiler Testing Center, Falls Church, Va.
BURROUGHS CORPORATION, B1990-DP SYSTEM, B1000 SYSTEM COBOL74 RELEASE 11.0 Validation Summary Report
30 Dec. 1983 75 p
(PB84-179241; OIT/FSTC-83/320) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Burroughs Corporation, B1000 System COBOL74 Release 11.0 running under the MCPII - Release 11.0 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the High level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-27488# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
GOULD INCORPORATED, GOULD CONCEPT 32/87, FORTRAN 77/X32 REL. 2.0
24 Jan. 1984 15 p
(PB84-175603; OIT/FSTC-83/293) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Gould Incorporated, FORTRAN 77/X32 Rel. 2.0 running under the MPX-32 Rev. 3, Rel. 3.2A provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Full Level FORTRAN level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-27489# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
GOULD INCORPORATED, GOULD CONCEPT 32/87, FORTRAN 77+REL.4.0
17 Jan. 1984 13 p
(PB84-175629; OIT/FSTC-83/292) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Gould Incorporated, FORTRAN 77 + Rel. 4.0 running under the MPX-32 Rev. 3, Rel. 3.2A provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Full Level FORTRAN level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-27490# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
IBM CORPORATION, IBM 4341, IBM BASIC/MVS RELEASE 1.0
27 Jan. 1984 11 p
(PB84-175611; OSD/FSTC-83/222) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the IBM Corporation, IBM BASIC/MVS Release 1.0 running under the MVS/SP Version 1 Release 3 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 BASIC Standard (X3.60-1978/FIPS PUB 68). The compiler was validated against the Minimal BASIC level of FIPS PUB 68. The VSR is made up of several sections showing all the discrepancies found if any. These include an overview of the validation which lists all categories of discrepancies thin X3.60-1978 and a detailed listing of discrepancies together with the tests which failed. GRA

N84-27491# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
COMPARING SOFTWARE DEVELOPMENT METHODOLOGIES FOR ADA (TRADE NAME): A STUDY PLAN Final Report
Peter Freeman, Anthony I. Wasserman (California Univ., Irvine), and Raymond C. Houghton, Jr., ed. Mar. 1984 38 p
(PB84-178029; NBSIR-84-2827) Avail: NTIS HC A03/MF A01 CSCL 09B

A study plan is presented that concentrates on the impact of alternative development methodologies on the mantainability of Ada code. The basic elements of the study include: (1) experts in each of several methods create Ada implementation for a specific problem, (2) each implementation is modified by each of several maintenance terms, and (3) the impact of the methodology on the maintainability of the resulting Ada coded systems is evaluated and reported. GRA

N84-27492# National Bureau of Standards, Boulder, Colo. Statistical Engineering. Div.
INTRODUCTION TO STARPAC. THE STANDARDS TIME SERIES AND REGRESSION PACKAGE
Janet R. Donaldson and Peter V. Tryon Oct. 1983 22 p refs
(PB84-178367; NBS-TN-1068-1; TN-1) Avail: NTIS HC A02/MF A01 CSCL 09B

The Standards Time Series and Regression Package (STARPAC) is a library of FORTRAN subroutines for statistical data analysis developed by the Statistical Engineering Division (SED) of the National Bureau of Standards (NBS), Boulder, Colorado. Earlier versions of this library were distributed under the name STATLIB. STARPAC incorporates many changes to STATLIB, including additional statistical techniques, improved algorithms and enhanced portability. STARPAC emphasizes the statistical interpretation of results, and, for this reason, comprehensive printed reports of auxiliary statistical information, often in graphical form, are automatically provided to augment the basic statistical computations performed by each user-callable STARPAC subroutine. An overview of the STARPAC library is given and

conventions used in the documentation are defined. An example using STARPAC subroutines is also presented. GRA

N84-26643# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS) COMPUTER SIMULATION OF BIRD IMPACT ON THE F-15 AIRCRAFT CANOPY
R. E. McCarty *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 973-1008 (For primary document see N84-26596 17-01)
(AD-P003230) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-26644# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
SIMULATION OF T-38 AIRCRAFT STUDENT CANOPY RESPONSE TO COCKPIT PRESSURE AND THERMAL LOADS USING MAGNA (MATERIALLY AND GEOMETRICALLY NONLINEAR ANALYSIS)
R. E. McCarty and R. A. Smith *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 1009-1039 (For primary document see N84-26596 17-01)
(AD-P003231) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-27160*# Arecibo Ionospheric Observatory, Puerto Rico.
DECODING: CODES AND HARDWARE IMPLEMENTATION
M. P. Sulzer and R. F. Woodman (Inst. Geofisico del Peru, Lima) *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 489-495 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 09B

N84-27161*# Northeast Radio Observatory Corp., Westford, Mass. Haystack Observatory.
DECODING: SOFTWARE IMPLEMENTATIONS
G. B. Loriot *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 496-506 refs (For primary document see N84-27076 17-42)
(Grant NSF ATM-80-00060)
Avail: NTIS HC A99/MF A01 CSCL 09B

62 COMPUTER SYSTEMS

Includes computer networks.

N84-27493# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
DISCRIM: A MODIFICATION OF TWINSPAN (HILL, 1979) TO CONSTRUCT SIMPLE DISCRIMINANT FUNCTIONS AND TO CLASSIFY ATTRIBUTES, GIVEN A HIERARCHIAL CLASSIFICATION OF SAMPLES
C. J. F. terBraak Dec. 1982 40 p refs
(Grant IWIS-06.17822)
Avail: NTIS HC A03/MF A01

The DISCRIM program, a modification of the TWINSPAN ecological analysis program is presented. The DISCRIM enables ecologists to explore the relationship between the occurrence of a set of species and a set of environmental characteristics within a set of samples. Author (ESA)

N84-27494# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
DIFFERENTIAL WEIGHTS FOR SAMPLES AND ATTRIBUTES IN THE ORDINATION PROGRAM DECORANA AND THE CLASSIFICATION PROGRAM TWINSPAN (HILL, 1979)
C. J. F. terBraak Dec. 1982 12 p refs
(Grant IWIS-06.17822)
Avail: NTIS HC A02/MF A01

A modification of the TWINSPAN and DECORANA ecology programs for cluster analysis and ordination is presented. It allows the user to specify differential weights for samples and attributes. Author (ESA)

N84-27495# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
TOP-DOWN DESIGN AND THE ALGEBRA OF COMMUNICATING PROCESSES
J. A. Bergstra and J. V. Tucker (Leeds University, United Kingdom) Jan. 1984 42 p refs Submitted for publication
(CWI-CS-R8401) Avail: NTIS HC A03/MF A01

An algebraic theory for the top down design of communicating systems in which levels of abstraction are represented by algebras, and their stepwise refinements are represented by homomorphisms is developed. The equational specification of these levels of abstraction is discussed. Examples include a top down design for a communication protocol. Author (ESA)

N84-27496# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
ASSESSMENT OF TECHNIQUES FOR EVALUATING COMPUTER SYSTEMS FOR FEDERAL AGENCY PROCUREMENTS Final Report
Helen Letmanyi Mar. 1984 39 p refs Prepared in cooperation with Mitre Corp., McLean, Va.
(PB84-176494; NBS-SP-500-113; LC-84-601012) Avail: NTIS HC A03/MF A01 CSCL 09B

The identification and qualitative assessment of computer system evaluation techniques for use during acquisition of computer systems is examined. The identification of several criteria by which these alternative evaluation techniques may be compared and selected is also described. The concepts presented are applicable to all sizes of general purpose computers, from microcomputers to mainframes. GRA

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N84-27497 Michigan State Univ., East Lansing.
ILL-POSED PROBLEMS IN OPTIMAL CONTROL SYSTEMS AND A METHOD TO SOLVE THEM Ph.D. Thesis
Lili Hedayatolah-Tabrizi 1983 305 p
Avail: Univ. Microfilms Order No. DA8407193

The concept of correctness for an extremely broad class of mathematical and optimal control problems presented in general form of either an operator equation or a minimization problem. The concept of an approximate solution of such problems that is stable to small changes in the initial data is defined and the methods of constructing solutions that are easily processed on a computer is examined. Precise definitions of well posedness and ill-posedness in the sense of Tikhonov and of Hadamard are presented for a general class of mathematical and optimal control problems. Examples of ill-posed problems relating both to the basic mathematical apparatus and also to a broad class of applied problems are presented. Different approaches to the solution of ill-posed problems are considered. The method of solving an incorrect problems depends basically upon the presence of additional information on the properties of the solution of the problem. The regularization method makes it possible to construct a sequence of uniformly converging solutons, without making a priori assumptions about a solution belonging to a given compact space. Dissert. Abstr.

N84-27498 Iowa Univ., Iowa City.
DELAYED FEEDBACK OPTIMAL CONTROLLER Ph.D. Thesis
Jaeho Kim 1983 104 p
Avail: Univ. Microfilms Order No. DA8407762

A new method for designing a tracking controller with incomplete state variables is investigated. Using only delayed values of observable variables and reference input function for the control, under certain conditions, it is possible to follow the reference input with zero steady state error. In some cases, it is necessary

to augment the original system with additional integrators. Feedback gains of the delayed observable variables are determined by minimizing a quadratic cost functional for a step reference function. Dissert. Abstr.

N84-27499# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IS ARTIFICIAL INTELLIGENCE POSSIBLE? [A INTELIGENCIA ARTIFICIAL E POSSIVEL]
Edson Luiz Franca Senne and Sandra Aparecida Sandri Jan. 1984 16 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Seminario ADUNESP, Guaratingueta, Brazil, 17-22 Oct. 1983
(INPE-3007-PRE/453) Avail: NTIS HC A02/MF A01

Artificial intelligence is the part of Computer Science which deals with the building of computer systems that show characteristics normally associated with intelligence in human behavior. Artificial intelligence has two major goals: (1) a programmatic one: to make computers more useful, by reduction of the restrictions imposed on the user; (2) a speculative one: to understand the principles that make intelligence possible. Some research areas in artificial intelligence are discussed including problem solving, natural language understanding, automatic programming, computer vision and robotics, and expert systems. Greater emphasis is given to the expert systems area, including the construction of a system being developed at the Divisao de Pesquisa e Desenvolvimento (Research and Development Division) of the Departamento de Informatica (Informatics Department) in INPE. Author

N84-27500# Yale Univ., New Haven, Conn. Dept. of Computer Science.
THE EXPLANATION GAME
R. C. Schank Mar. 1984 31 p
(Contracts N00014-75-C-1111; N00014-82-K-0149)
(AD-A140681; YALEU/CSD/RR-307) Avail: NTIS HC A03/MF A01 CSCL 06/4

In 1952 Alfred Turing proposed a test which he believed might serve as a touchstone for Artificial Intelligence researchers in their efforts to model understanding by computer. The essence of this test, which Turing called the Imitation Game, was to challenge a person to distinguish between a computer program and another human being by putting questions to each via teletype. Much has been made of this test in subsequent discussions concerning the ultimate success or failure of Artificial Intelligence (AI). Unfortunately, the requirements of Turing's test are so rigorous that no program in existence today is close to succeeding, and none is likely to be for along time to come. As a result, such discussions tend toward metaphysics and away from practical scientific concerns. In this paper we examine the question of how to judge the success of an AI program from a research's point of view. GRA

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N84-27501 Academy of Sciences of the Ukrainian SSR, Kharkov (USSR).
INTEGRAL EQUATIONS OF ELECTRODYNAMICS IN STRATIFIED MEDIA
N. M. Bogomolov, N. P. Zhook, and O. A. Tretyakov 1983 42 p refs In RUSSIAN; ENGLISH summary
(Rept-223) Copyright. Avail: Issuing Activity

Green's functions of Maxwell's equations for stratified media are obtained and analyzed. Integro-differential and singular integral equations for the problem of electromagnetic and acoustic wave scattering on a scatterer embedded in the stratified medium are formulated. Author

N84-27502 New York Univ., New York.
A RIGID EMBEDDING OF THE CLOSED FRIEDMANN MANIFOLD Ph.D. Thesis
Salvatore Lauro 1983 99 p
Avail: Univ. Microfilms Order No. DA8405785

The closed, matter-dominated Friedmann model of constant positive curvature is discussed. It is assumed that the cosmological constant LAMBDA = 0 and pressure p = 0. The embedding of the Friedmann manifold is globally rigid and as a result one gain a better understanding of the nature of it singularities. A study of global embeddings leads one to determination of the invariant properties of the singularity. Global rigidity of the embedding determines the extrinsic properties that leave the intrinsic properties invariant and as a result lead to a complete description of the structure of the singularities. Consequently this leads to deeper insights into the nature of the singularity which shows how the geometry of the manifold affects the structure of matter in this closed Friedmann model of the universe. Dissert. Abstr.

N84-27503*# Scientific Research Associates, Inc., Glastonbury, Conn.
SOLUTION OF 3-DIMENSIONAL TIME-DEPENDENT VISCOUS FLOWS. PART 1: INVESTIGATION OF CANDIDATE ALGORITHS
Bernard C. Weinberg and Henry McDonald Apr. 1979 86 p refs 3 Vol.
(Contract NAS2-10016)
(NASA-CR-166565-Pt-1; NAS 1.26:166565-Pt-1) Avail: NTIS HC A05/MF A01 CSCL 12A

There is considerable interest in developing a numerical scheme for solving the time dependent viscous compressible three dimensional flow to aid in the design of helicopter rotors. Numerical algorithms are examined to determine their overall suitability for the efficient and routine solution of an appropriate system of partial differential equations. It is concluded that a consistently split time linearized block implicit scheme using either quintic B spline collocation or the generalized operator compact implicit approach to generate a fourth order accurate algorithm is particularly well suited for use on the present problem. High cell Reynolds number behavior leads to favoring the generalized operator compact implicit approach over the quintic B spline collocation method. M.A.C.

N84-27504# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE NUMERICAL SOLUTION OF SOME DIFFUSION PROBLEMS USING THE FINITE ELEMENT METHOD Ph.D. Thesis [ESTUDO DA SOLUCAO NUMERICA DE ALGUNS PROBLEMAS DE DIFUSAO, USANDO O METODO DE ELEMENTOS FINITOS]
Hans-Ulrich Pilchowski Feb. 1984 150 p refs In PORTUGUESE; ENGLISH summary
(INPE-3003-TDL/154) Avail: NTIS HC A07/MF A01

A numerical method for solving diffusion problems is developed, particularly for a class of transient process field problems, using a finite element approach. The method is developed considering time as a variable of the same kind as the space variables, and uses triangular elements at (x,t) plane, i.e., space-time elements. The problem is not treated by variable space and time separation, because in this case it does not give crossed contribution in time at the space-time net. The method makes it possible to build computer programs where initial and boundary conditions are done as data, so it becomes possible to study optimization of projects, in cases where other methods (finite differences) are not applicable because, for them, it is necessary to construct a new computer program for any new boundary condition. Author

N84-27505*# College of William and Mary, Williamsburg, Va.
APPLICATIONS OF SPECTRAL METHODS TO TURBULENT MAGNETOFLUIDS IN SPACE AND FUSION RESEARCH
David Montgomery, Robert G. Voigt, ed., David Gottlieb, ed., and M. Yousuff Hussaini, ed. 1984 17 p refs
(Grant NsG-7416; Contract DE-AS05-76ET-53045)
(NASA-CR-173665; NAS 1.26:173665) Avail: NTIS HC A02/MF A01 CSCL 12A

Recent and potential applications of spectral method computa-

tion to incompressible, dissipative magnetohydrodynamics are surveyed. Linear stability problems for one dimensional, quasi-equilibria are approachable through a close analogue of the Orr-Sommerfeld equation. It is likely that for Reynolds-like numbers above certain as-yet-undetermined thresholds, all magnetofluids are turbulent. Four recent effects in MHD turbulence are remarked upon, as they have displayed themselves in spectral method computations: (1) inverse cascades; (2) small-scale intermittent dissipative structures; (3) selective decays of ideal global invariants relative to each other; and (4) anisotropy induced by a mean dc magnetic field. Two more conjectured applications are suggested. All the turbulent processes discussed are sometimes involved in current carrying confined fusion magnetoplasmas and in space plasmas. Author

N84-27506# Army Armament Research and Development Command, Aberdeen Proving Ground, Md.
CALCULATION OF LEGENDRE FUNCTIONS ON THE CUT FOR INTEGRAL ORDER AND COMPLEX DEGREE BY MEANS OF GAUSS CONTINUED FRACTIONS
Alexander S. Elder, James N. Walbert, and Eric C. Benck Feb. 1984 49 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A1369630; AD-F300398; ARBRL-MR-03335) Avail: NTIS HC A03/MF A01 CSCL 12/1

A method for calculating the associated Legendre functions for integral order and complex degree is presented. Comparison with special cases indicates a precision of at least 25 significant digits is attained. Author

N84-27507# California Univ., Berkeley. Operations Research Center.
INFORMATIVE STOPPING RULES
Richard E. Barlow and S. W. W. Shor (Bechtel Power Corp., San Francisco, Calif.) Jan. 1984 22 p
(Grant AF-AFOSR-0122-81; AF Proj. 2304)
(AD-A140599; ORC-84-1) Avail: NTIS HC A02/MF A01 CSCL 12/1

A stopping rule, given data, is informative relative to parameters of interest if it is random and statistically dependent on those parameters. Practical examples considered in detail illuminate the role of informative stopping rules and show how they may arise in practice. The discussion is based on the Bayesian Approach. Author (GRA)

N84-27508# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
AN APPLICATION OF NUMBER THEORY TO THE ORGANIZATION OF RASTER-GRAPHICS MEMORY Interim Research Report
B. Chor, C. Leiserson, R. Rivest, and J. Shearer Apr. 1984 24 p
(Contract N00014-80-C-0622; Grant NSF MCS-80-06938)
(AD-A140638; MIT/LCS/TM-258) Avail: NTIS HC A02/MF A01 CSCL 12/1

A high-resolution raster-graphics display is usually combined with processing power and a memory organization that facilitates basic graphics operations. For many applications, including interactive text processing, the ability to quickly move or copy small rectangles of pixels is essential. This paper proposes a novel organization of raster-graphics memory that permits all small rectangles to be moved efficiently. The memory organization is based on a doubly periodic assignment of pixels to M memory chips according to a Fibonacci lattice. The memory organization guarantees that if a rectilinearly oriented rectangle contains fewer than M/square root of 5 pixels, then all pixels will reside in different memory chips, and thus can be accessed simultaneously. The authors also define a continuous analogue of the problem which can be posed as, 'What is the maximum density of a set of points in the plane such that no two points are contained in the interior of a rectilinearly oriented rectangle of unit area.' They show the existence of such a set with density 1/square root of 5, and prove this is optimal by giving a matching upper bound. GRA

N84-27509# Naval Postgraduate School, Monterey, Calif.
SUPPRESSION OF FINITE-AMPLITUDE EFFECTS IN SLOSHING MODES IN CYLINDRICAL CAVITIES M.S. Thesis
H. Y. Si Dec. 1983 38 p
(AD-A140652) Avail: NTIS HC A03/MF A01 CSCL 12/1

A perturbation expansion is formulated for the three dimensional, nonlinear, acoustic-wave equation with dissipative term describing the viscous and thermal energy losses encountered in a cylindrical cavity. The theoretical results show that nonlinear effects in sloshing modes are strongly suppressed. Author (GRA)

N84-27510# Naval Postgraduate School, Monterey, Calif.
ON THE DISTRIBUTION OF COMPLEXITY FOR DE BRUIJN SEQUENCES M.S. Thesis
R. L. Holdahl Jun. 1983 72 p
(AD-A140679) Avail: NTIS HC A04/MF A01 CSCL 12/1

De Bruijn sequences have been the subject of recurring interest since their discovery over a century ago. Recent developments in radar ranging, error correcting codes, secure or limited access code generators, and mathematical modeling have made application of de Bruijn sequences because of their properties. The binary shift registers readily model digital computers with electronic states where 1 indicates the on state and 0 indicates the off state. GRA

N84-27511# Yale Univ., New Haven, Conn.
PRECONDITIONED ITERATIVE METHODS FOR NONSELFADJOINT OR INDEFINITE ELLIPTIC BOUNDARY VALUE PROBLEMS
J. H. Bramble (Cornell Univ.) and J. E. Pasciak (Brookhaven National Lab.) Mar. 1984 20 p
(Contracts N00014-82-K-0184; DE-AC02-76CH-00016)
(AD-A140777; YALEU/DCS/RR-309) Avail: NTIS HC A02/MF A01 CSCL 12/1

The authors consider a Galerkin-Finite Element approximation to a general linear elliptic boundary value problem which may be nonselfadjoint or indefinite. They show how to precondition the equations so that the resulting systems of linear algebraic equations lead to iteration procedures whose iterative convergence rates are independent of the number of unknowns in the solution. Author (GRA)

N84-27512# Yale Univ., New Haven, Conn. Dept. of Computer Science.
PARALLEL SCALED GIVENS ROTATIONS FOR THE SOLUTION OF LINEAR LEAST SQUARES PROBLEMS
J. L. Barlow and I. C. F. Ipsen Mar. 1984 21 p
(Contract N00014-82-K-0184)
(AD-A140778; YALEU/DCS/RR-310) Avail: NTIS HC A02/MF A01 CSCL 12/1

A class of parallel scaled Givens rotations, to be applied to weighted multiple linear least squares problems, is discussed. In comparison to Fast Givens transformations, properly scaled rotations for weighted problems exhibit the same stability, require fewer divisions, and avoid square roots as well as pivoting. Consequently, with a suitable elimination strategy, the algorithm is amenable to parallel linear-time implementation on systolic arrays in VLSI. Round off error and stability analyses are presented, indicating slightly less accumulation of round off error than known sequential methods. Author (GRA)

N84-27513# Yale Univ., New Haven, Conn. Dept. of Computer Science.
STABLE EXPLICIT SCHEMES FOR EQUATIONS OF THE SCHROEDINGER TYPE
T. F. Chan, D. Lee, and L. Shen Mar. 1984 10 p
(Contracts N00014-82-K-0184; DE-AC02-81ER-10996)
(AD-A140779; Yaleu/DCS/RR-305) Avail: NTIS HC A02/MF A01 CSCL 12/1

Most conventional explicit finite difference schemes, e.g., Euler's scheme, for solving the parabolic equation of Schroedinger type u sub t = iu sub zz are unconditionally unstable. This difficulty can be overcome by introducing a dissipative term to the conventional explicit schemes. Based on this approach, the authors derive

a class of new explicit finite difference schemes which are conditionally stable, spans two time levels and are O(k,h2) accurate. They also determine the schemes from this class that have the least restrictive stability requirements. It is interesting to note that the analog of the Lax-Wendroff scheme is unstable. Author (GRA)

N84-27514# Naval Postgraduate School, Monterey, Calif.
AN AUTOREGRESSIVE PROCESS FOR BETA RANDOM VARIABLES
E. McKenzie Dec. 1983 32 p
(RR0-0001)
(AD-A140848; NPS55-83-037) Avail: NTIS HC A03/MF A01 CSCL 12/1

Two stationary first-order autoregressive processes with Beta marginal distributions are presented. They are both linear, additive processes but the coefficients are Beta random variables. Their autocorrelation functions are investigated: one is positive and the other alternates in sign. The usefulness of the models in simulation is discussed. The Bivariate Beta distributions of two consecutive observations are considered in some detail. Several examples are given, including a Bivariate Uniform process which is also examined in detail. The relationship of these Bivariate Beta distributions to the Dirichelet distribution is discussed. Author (GRA)

N84-27515# California Univ., San Diego. Inst. for Cognitive Science.
HARMONY THEORY: PROBLEM SOLVING, PARALLEL COGNITIVE MODELS AND THERMAL PHYSICS
P. Smolensky and M. S. Riley Apr. 1984 43 p
(Contract N00014-79-C-0323)
(AD-A140877; AD-E500637; ICS-8403) Avail: NTIS HC A03/MF A01 CSCL 12/1

The first paper describes a parallel model designed to solve a class of relatively simple problems from elementary physics, and discusses the implications for models of problem solving in general. The authors show how one of the most salient features of problem solving, sequentiality, can emerge naturally within a parallel model that has no explicit knowledge of how to sequence analysis. This model exploits a new type of parallel distributed processing that employs stochastic processors and is based on a formal mapping between parallel computation and thermal physics. The mathematical theory is this type of processing-harmony theory-is discussed in the second and third papers. Author (GRA)

N84-27516# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
A GENERALIZATION OF AUTOCORRELATION AND PARTIAL AUTOCORRELATION FUNCTIONS USEFUL FOR IDENTIFICATION OF ARMA(p,q) PROCESSES
A. Takemura Apr. 1984 25 p
(Contract N00014-84-C-0167)
(AD-A140880; AD-E500637; TR-84-16) Avail: NTIS HC A02/MF A01 CSCL 12/1

A new definition of generalized autocorrelation function is proposed. It has properties useful for identification of ARMA processes. The advantages of the proposed procedure include simple asymptotic theory and quick recursive computation. These are natural generalizations of corresponding results for autocorrelation and partial autocorrelation functions. Author (GRA)

N84-27517# Naval Postgraduate School, Monterey, Calif.
HIGH-SPEED RECURSIVE DIGITAL FILTER REALIZATION
H. H. Loomis, Jr. and B. Sinha 6 Feb. 1984 51 p
(AD-A140904; NPS62-84-061) Avail: NTIS HC A04/MF A01 CSCL 12/1

Pipeline techniques have been successfully applied to speeding up processing in both general and special purpose digital computers. Application of these techniques to nonrecursive filters has been suggested and is quite straightforward. Application to recursive filters has not previously been shown. In this paper, the technique for applying pipeline techniques to recursive filters is shown and the advantages and disadvantages of the technique are discussed. Using these techniques, recursive digital filters operating at hitherto impossibly high rates can be designed. Author (GRA)

N84-27518# Stanford Univ., Calif. Dept. of Statistics.
COMMENTS ON A PROBLEM OF CHERNOFF AND PETKAU
M. L. Hogan May 1984 11 p
(Contract N00014-77-C-0306)
(AD-A140911; SU-TR-27) Avail: NTIS HC A02/MF A01 CSCL 12/1

A new method is used to study the optimal stopping set corrected for discreteness introduced by Chernoff and studied by Chernoff and Petkau. The discrete boundary is asymptotically the optimal boundary for a Wiener process translated downward by a constant amount. This amount is shown to be an excess over the boundary term, and this method yields it as a simple integral involving the characteristic function of the random walk. Author (GRA)

N84-27519# Stanford Univ., Calif. Dept. of Statistics.
COMMENT ON CORRECTED DIFFUSION APPROXIMATIONS IN CERTAIN RANDOM WALK PROBLEMS'
M. L. Hogan May 1984 18 p
(Contract N00014-77-C-0306)
(AD-A140923; SU-TR-26) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper is concerned with extensions to the nonexponential family case of two problems considered in an earlier work. The first problem is to find the expected value of the maximum of a random walk with small, negative drift, and the second is to find the distribution of the same quantity. GRA

N84-27520# Chalmers Univ. of Technology, Goteborg (Sweden). Dept of Mathematics.
ON THE KAKEYA PROBLEM
Arne Broman 1983 29 p refs Presented at Western Wash. Univ., 7 Jul. 1983 and at Goteborg, 13 Dec. 1983 Submitted for publication
(CTH-Math-1983-23; ISSN-0347-2809) Avail: NTIS HC A03/MF A01

Kakeya's problem is analyzed, using Besicovicth's variant to obtain the Bloom-Schonberg number on Kakeya's constant. Cunningham's theorems are advocated. Author (ESA)

N84-27521# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
AN INFINITE L: ESTIMATE FOR THE DELTA BAR EQUATION IN THE BALL IN C SUP N
Bo Berndtsson 1983 38 p refs Submitted for publication
(Math-Math-1983-29; ISSN-0347-2809) Avail: NTIS HC A03/MF A01

Jones' idea in several variables is used to give an infinite L estimate for solutions to the delta bar equation in the unit disk. Constructive proof of Hormander's theorem by an explicit formula for the existence of a solution for the differential equation is given. Author (ESA)

N84-27522# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
SUPREMUM CONVOLUTIONS AND GREENIAN POTENTIALS IN A SPECIAL CASE
Christer Borell 1983 12 p refs Submitted for publication
(CTH-Math-1983-31; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

Geometric properties of a solution of a Poisson differential equation on a bounded convex domain in n-dimensional space are proved. Conclusions are extended to lambda-supremum convolutions. Author (ESA)

N84-27523# Bonn Univ. (West Germany). Sonderforschungsbereich 72.
ON THE SINGULAR SET AND THE UNIQUENESS OF WEAK SOLUTIONS OF THE NAVIER-STOKES EQUATIONS
Hermann Sohr and Wolf vonWahl Jan. 1984 33 p refs Submitted for publication Sponsored by Deutschen Forschungsgemeinschaft

(Preprint-635) Avail: NTIS HC A03/MF A01

Regularity properties of weak solutions of Navier-Stokes equations in L to infinity ((OT), L to n (omega)) and in L to p ((O.T), L to n (omega)) for p < or = 2 are studied. It is shown that L to infinity ((O.T.) L to n (omega)) is a uniqueness class for weak solutions. Serrin's uniqueness result is generalized: let u be a weak solution with initial value u0 a member of L to n (omega), divergence of u0 = 0, and let v be the local strong solution with the same data, then u = v as long as the strong solution exists. Author (ESA)

N84-27524# Bonn Univ. (West Germany). Sonderforschungsbereichen 72.

NEW HYDRODYNAMIC POTENTIALS AND A FREE BOUNDARY VALUE PROBLEM OF THE STATIONARY STOKES EQUATION

F. K. Hebeker (Paderborn University, West Germany) Jan. 1984 35 p refs Submitted for publication Sponsored by Deutschen Forschungsgemeinschaft

(Preprint-636) Avail: NTIS HC A03/MF A01

The boundary value problem of the velocity field and pressure function of a viscous incompressible flow in a smoothly bounded region is investigated. Hydrodynamic potentials are introduced to transform into a singular integral equations system. Its solvability properties are treated, and numerical applications are considered. Author (ESA)

N84-26907# Joint Publications Research Service, Arlington, Va.

DETERMINING ORIENTATION OF SOLID OBJECT Abstract Only

V. B. Larin and K. I. Naumenko *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 16 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 3, Mar. 1983 p 24-32 (For primary document see N84-26895 17-31)

Avail: NTIS HC A04/MF A01

N84-26908# Joint Publications Research Service, Arlington, Va.

EQUATATIONS IN RODRIGUES-HAMILTON PARAMETERS FOR HEAVY SOLID BODY ROTATING ABOUT FIXED POINT Abstract Only

V. N. Koshlyakov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 16-17 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Tverd. Tela (Moscow), no. 4, Apr. 1983 p 16-25 (For primary document see N84-26895 17-31)

Avail: NTIS HC A04/MF A01

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N84-27525# Missouri Univ., Rolla. Dept. of Mathematics and Statistics.

APPROXIMATING THE LEVEL PROBABILITIES IN ORDER RESTRICTED INFERENCE: THE SIMPLE TREE ORDERING Interim Report

F. T. Wright and T. Tran Apr. 1984 28 p

(Contract N00014-80-C-0322)

(AD-A140684) Avail: NTIS HC A03/MF A01 CSCL 12/1

Distribution theory for the likelihood ratio statistics for the comparison of several treatments with a control is discussed. These test statistics account for prior information that the treatments are at least as effective as the control. Their null distributions are mixtures of chi-squared or beta distributions and the mixing coefficients, which are level probabilities, are intractable for even a moderate number of treatments and unequal weights, which are typically the sample sizes. The distribution corresponding to equal weights is considered as an approximation and an approximation based on the pattern of large and small weights is developed. Both are adequate for moderate variations in the weights, but the approximation based on patterns in the weight set is considerably more accurate for larger variations. Author (GRA)

N84-27526# Ballistic Research Labs., Aberdeen Proving Ground, Md.

MATHEMATICS OF MULTIDART PROBABILITY PREDICTIONS

L. D. Johnson Apr. 1984 12 p

(DA Proj. 1L1-62603-AH-18)

(AD-A140745; AD-F300417; ARBRL-MR-03348; RBRL-IMR-660) Avail: NTIS HC A02/MF A01 CSCL 19/4

A general equation has been derived which can be used to predict the hit and kill probability of multidart single shot patterns, as well as single dart multishot patterns. GRA

N84-27527# Naval Postgraduate School, Monterey, Calif.

A NOTE ON THE DERIVATION OF THEORETICAL AUTO-COVARIANCES FOR ARMA MODELS

E. McKenzie Feb. 1984 11 p

(RR00001)

(AD-A140829; NPS55-84-006) Avail: NTIS HC A02/MF A01 CSCL 12/1

Derivation of the theoretical autocovariances of an ARMA model is important for a number of purposes associated with the estimation and testing of the model. One common algorithm, due to McLeod, involves solving a system of linear equations. By deriving the determinant of the matrix of coefficients in these equations we can ascertain the behaviour of the algorithm with respect to the stationarity of the ARMA model. Author (GRA)

N84-27528# Massachusetts Inst. of Tech., Cambridge. Statistics Center.

ON THE REPRESENTATION OF PROBABILITY DISTRIBUTIONS AS THE CONVOLUTION OF SYMMETRIC AND COMPLETELY ASYMMETRIC PARTS

S. P. Ellis Mar. 1984 11 p

(Contract N00014-75-C-0555)

(AD-A140843; TR-35-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Let F, G, and H be probability distributions on the line each having finite variance and suppose G is symmetric. F is completely asymmetric (c.as.) if the equation F = G*H implies G = delta sub 0, i.e. is degenerate. It's proven that F can always be written F = G*H where H is c.as., but this representation may not be unique. Examples of singular and absolutely continuous (with respect to Lebesgue measure) c.as. distributions are given. Some extensions of these ideas are mentioned. Author (GRA)

N84-27529# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

CONTINUOUS SINGULAR PROBABILITY MEASURES THAT ARE ALMOST LATTICE

Hasse Carlsson and Olle Nerman 1983 7 p refs Submitted for publication

(CTH-Math-1983-26; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

Continuous singular probability measures with compact support and weak remainder in normal approximations are constructed. Examples of renewal theory are given. Author (ESA)

N84-27530# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

ON COUPLING OF RENEWAL PROCESSES WITH USE OF FAILURE RATES

Torgny Lindvall 1983 30 p refs Submitted for publication

(CTH-Math-1983-27; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

Possibilities of coupling renewal processes with lifelength distribution possessing the decreasing failure rate property are elaborated. Closely related coupling and the coupling construction are presented. Author (ESA)

N84-27531# National Aerospace Lab., Amsterdam (Netherlands). Space Div.

AN AXIOMATIC THEORY OF CONCENTRATION AND

DIVERSITY
J. C. A. vanderLubbe 4 Mar. 1983 59 p refs Submitted for publication
(NLR-MP-83015-U) Avail: NTIS HC A04/MF A01

It is shown that developments in statistical information theory can contribute to the measurement of concentration and diversity in biology and ecology. A generalized concentration index is introduced and axiomatically characterized. Algebraic, analytic and geometrical properties are investigated. The interpretation of these properties within the given context and the choices of values of the parameters for practical applications are considered. Based on this generalized concentration index, it is possible to give an axiomatic characterization for a class of diversity indices. The properties of this class are the reverse of those of the concentration index. Author (ESA)

N84-27532# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research and System Theory.
THE WEAK STOCHASTIC REALIZATION PROBLEM FOR DISCRETE-TIME COUNTING PROCESSES
J. H. vanSchuppen Dec. 1983 14 p refs Submitted for publication
(MC-BW-191/83) Avail: NTIS HC A02/MF A01

The weak stochastic realization problem for discrete-time stationary counting processes is considered. Such processes take values in the countable infinite set N = (0,1,2,...). A stochastic realization is sought in the class of stochastic systems specified by a conditional distribution for the output given the state of Poisson type, and by a finite valued state process. A necessary and sufficient condition is derived for the existence of a stochastic realization in the specified class. Author (ESA)

N84-27533# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research and System Theory.
INVARIANCE PROPERTIES OF THE CONDITIONAL INDEPENDENCE RELATION
C. vanPutten (N.V. Philips Gloeilampenfabrieken, Eindhoven, Netherlands) and J. H. vanSchuppen Dec. 1982 18 p refs Submitted for publication
(MC-BW-193/83) Avail: NTIS HC A02/MF A01

The conditional independence relation for a triple of sigma-algebras is investigated. For certain operations on this relation, necessary and sufficient conditions are derived such that these operations leave the relation invariant. Examples of such operations are the enlargement or reduction of the sigma-algebras, and an absolute continuous change of measure. A projection operator for sigma-algebras is defined and of its properties are stated. The sigma-algebraic realization problem is discussed. Author (ESA)

N84-27534# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research and System Theory.
OPTIMAL CONTROL OF PARTIALLY OBSERVABLE STOCHASTIC SYSTEMS WITH AN EXPONENTIAL-OF-INTEGRAL PERFORMANCE INDEX
A. Bensoussan (Paris University, Dauphine) and J. H. vanSchuppen Dec. 1983 28 p refs Submitted for publication
(MC-BW-194/83) Avail: NTIS HC A03/MF A01

The stochastic control problem with linear stochastic differential equations driven by Brownian motion processes and as cost functional the exponential of a quadratic forms is considered. The solution of a linear control law, and of a linear stochastic differential equation which has the same structure as the Kalman filter but depends explicitly on the cost functional is shown to exist. The separation property does not hold in general for the solution to this problem. Author (ESA)

N84-27535# Center for Mathematics and Computer Science, Amsterdam (Netherlands). Dept. of Operations Research and System Theory.
NEW DIRECTIONS IN SCHEDULING THEORY
J. K. Lenstra (Erasmus University, Rotterdam) and A. H. G. Rinnooykan Jan. 1984 13 p refs
(CWI-OS-R8401) Avail: NTIS HC A02/MF A01

Developments in the theory of sequencing and scheduling are assessed. Results and open questions within the traditional class of scheduling problems are discussed. Probabilistic analysis of scheduling algorithms, and extensions of the traditional problem class are considered. Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N84-27536# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research and System Theory.
A NOTE ON DELBROUCK'S APPROXIMATE SOLUTION TO THE HETEROGENEOUS BLOCKING PROBLEM
E. A. vanDoorn Dec. 1983 11 p refs Submitted for publication
(MC-BW-190/83) Avail: NTIS HC A02/MF A01

Estimates for the call blocking probabilities experienced by heterogeneous traffic streams on a common trunk group are elucidated. A link with earlier estimates is established by a Manfield and Downs type approximation. Author (ESA)

N84-27537# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research and System Theory.
THE RELAXATION TIME OF TWO QUEUEING SYSTEMS IN SERIES
J. P. C. Blanc Dec. 1983 16 p refs Submitted for publication
(MC-BW-192/83) Avail: NTIS HC A02/MF A01

The time-dependent behavior of two queueing systems in series, the simplest example of a Jackson network is considered. The Laplace transform of the probability p0(t) that the tandem system is empty at time t is obtained by reducing the functional equation for the generating function of the joint queue length distribution to a Riemann-Hilbert boundary value problem. From this Laplace transform the relaxation time of p0(t) is determined for all cases, and the first term of the asymptotic expansion of p0(t) - p0 (infinity) as t tends to infinity is found in the ergodic and in the null recurrent cases. Author (ESA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N84-27538# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
RESOLUTION OF SINGULARITIES OF INTEGRAL QUADRATIC FORMS
Juliusz Brzezinskim 1983 10 p refs Submitted for publication
(CTH-Math-1983-22; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

Classification and resolution of singularites of arithmetical conic bundle surfaces in 3 dimensional space are discussed. Hypersurfaces associated with integral quadratic forms are given. Author (ESA)

N84-27539# Ruhr Univ., Bochum (West Germany). Inst. fuer Mechanik.
SOME REMARKS ON THE DEFINITION OF MATERIAL ISOTROPY
Th. Lehmann and A. Meyers 1983 23 p refs Presented at Tagungsber. Kontinuumsmech. fester Koerper. Oberwolfach, West Ger., 2-8 Jan. 1983
Avail: NTIS HC A02/MF A01

Lagrangian and Eulerian descriptions of isotropy of an elastic material are compared. The proof of equivalence of the two definitions is given in space-fixed and co-moving coordinates. Author (ESA)

N84-27540# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics

ON K-THEORY OF CONICAL FIBRATIONS
Per Salberger 1983 16 p refs Submitted for publication
(CTH-Math-1983-25; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

A partial generalization of Quillen's theorem on the K-groups of Severi-Brauer schemes is given. The canonical fibrations on K-Theory are considered. Author (ESA)

N84-27541# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
A NOTE ON A CYCLOTOMIC DIOPHANTINE EQUATION
Leif Cardell 1983 16 p refs Submitted for publication
(CTH-Math-1983-28; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

A proof of Ennola's theorem of the general equation for n-th roots of unity of cyclotomic diophantine equation where n is a prime number, is given. Author (ESA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N84-27542# Draper (Charles Stark) Lab., Inc., Boston, Mass.
MATERIALS. RESEARCH FOR ADVANCED INERTIAL INSTRUMENTATION. TASK 3: RARE EARTH MAGNETIC MATERIAL TECHNOLOGY AS RELATED TO GYRO TORQUERS AND MOTORS Final Report, 1 Oct. 1977 - 31 Dec. 1983
K. Kumar, D. Das, and H. Newborn Feb. 1984 62 p
(Contract N00014-77-C-0388)
(AD-A140611; CSDL-R-1695) Avail: NTIS HC A04/MF A01 CSCL 20/3

The initial objectives of this effort included development of the appropriate understanding (and demonstration of the feasibility) of being able to produce high energy product SmCo5 magnets with (1) high flux stability, (2) adequate temperature compensation, and (3) coefficient of thermal expansion matched closely to that of beryllium. The first objective was the most difficult to achieve and required the most effort. The third proved to be the least problematic. GRA

N84-26944# Joint Publications Research Service, Arlington, Va.
STABILITY OF STEADY MOTION OF PLANAR BODY IN FIELD OF CENTRAL FORCE Abstract Only
V. F. Zhuraviev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 42-43 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 83 p 71-76 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

N84-26946# Joint Publications Research Service, Arlington, Va.
INTEGRABLE EQUATIONS OF MOTION BY INERTIA FOR TWO BODIES COUPLED THROUGH SPHERICAL HINGE Abstract Only
M. Ye. Lesina and P. V. Kharlamov *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 44 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 26-31 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution*.

N84-27543*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A NEW METHOD FOR DETERMINING ACOUSTIC-LINER ADMITTANCE IN A RECTANGULAR DUCT WITH GRAZING FLOW FROM EXPERIMENTAL DATA
Willie R. Watson Jul. 1984 19 p refs
(NASA-TP-2310; L-15779; NAS 1.60:2310) Avail: NTIS HC A02/MF A01 CSCL 20A

A method is developed for determining acoustic liner admittance in a rectangular duct with grazing flow. The axial propagation constant, cross mode order, and mean flow profile is measured. These measured data are then input into an analytical program which determines the unknown admittance value. The analytical program is based upon a finite element discretization of the acoustic field and a reposing of the unknown admittance value as a linear eigenvalue problem on the admittance value. Gaussian elimination is employed to solve this eigenvalue problem. The method used is extendable to grazing flows with boundary layers in both transverse directions of an impedance tube (or duct). Predicted admittance values are compared both with exact values that can be obtained for uniform mean flow profiles and with those from a Runge Kutta integration technique for cases involving a one dimensional boundary layer. M.A.C.

N84-27544*# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
STUDIES OF ACOUSTICAL PROPERTIES OF BULK POROUS FLEXIBLE MATERIALS Final Report
Robert F. Lambert 30 Jun. 1984 29 p refs
(Grant NAG3-161)
(NASA-CR-173622; NAS 1.26:173622) Avail: NTIS HC A03/MF A01 CSCL 20A

Acoustic prediction and measurement of bulk porous materials with flexible frames is investigated. The acoustic properties of Kevlar 29 are examined. Various acoustic tests are employed to determine impedance, sound wave propagation, and wave pressure equations for the highly porous fiber composites. The derivation of design equations and future research goals are included. For individual titles, see N84-27545 through N84-27547.

N84-27545*# Minnesota Univ., Minneapolis. Inst. of Technology.
SURFACE ACOUSTIC ADMITTANCE AND ABSORPTION OF HIGHLY POROUS, LAYERED, FIBROUS MATERIALS Abstract Only
J. S. Tesar and Robert F. Lambert *In its* Studies of Acoustical Properties of Bulk Porous Flexible Mater. 30 Jun. 1984 1 p (For primary document see N84-27544 17-71)
Avail: NTIS HC A03/MF A01 CSCL 20A

Some acoustic properties of Kevlar-29 - a fine fibered, layered material is investigated. Kevlar is characterized by very high strength, uniform filaments arranged in a parallel batt where most filaments are random in the x-y plane but ordered as planes in the z direction. For experimental purposes, volume porosity, static flow resistance and mean filament diameter are used to identify the material. To determine the acoustic surface admittance of Kevlar, batts of the material are cut into small pads and placed into a standing wave tube terminated by a rigid brass plug. The attenuation and relative phase shift are recorded at each frequency in the range of 50 to 6000 Hz. Normalized conductance and susceptance are combined to form the acoustic absorption coefficient. The data are compared with theory by plotting the normalized admittance and normal incident absorption coefficient versus cyclic frequency. M.A.C.

N84-27546*# Minnesota Univ., Minneapolis. Inst. of Technology.
ACOUSTIC STRUCTURE AND PROPAGATION IN HIGHLY POROUS, LAYERED, FIBROUS MATERIALS
Robert F. Lambert and J. S. Tesar *In its* Studies of Acoustical Properties of Bulk Porous Flexible Mater. 30 Jun. 1984 16 p refs (For primary document see N84-27544 17-71)
Avail: NTIS HC A03/MF A01 CSCL 20A

The acoustic structure and propagation of sound in highly porous, layered, fine fiber materials is examined. Of particular interest is the utilization of the Kozeny number for determining

the static flow resistance and the static structure factor based on flow permeability measurements. In this formulation the Kozeny number is a numerical constant independent of volume porosity at high porosities. The other essential parameters are then evaluated employing techniques developed earlier for open cell foams. The attenuation and progressive phase characteristics in bulk samples are measured and compared with predicted values. The agreements on the whole are very satisfactory. M.A.C.

N84-27547*# Minnesota Univ., Minneapolis. Inst. of Technology.
ABSORPTIVE SURFACES OF EXTENDED REACTION ANGLE OF INCIDENCE CONSIDERATIONS
Robert F. Lambert *In its* Studies of Acoustical Properties of Bulk Porous Flexible Mater. 30 Jun. 1984 5 p (For primary document see N84-27544 17-71)
Avail: NTIS HC A03/MF A01 CSCL 20A

The acoustic properties of a porous absorbing surface are characterized to apply the concepts to practical situations. Propagation constants, impedance, incident pressure wave, sound waves in the air of the pores, and general acoustic behavior are presented mathematically. The design equations are applicable for highly porous bulk materials. Modified equations are appropriate for bulk liners with stiff frames or flexible frames of finite depth. M.A.C.

N84-27548# Middleton (David), New York.
MULTIPLE-ELEMENT THRESHOLD SIGNAL DETECTION OF UNDERWATER ACOUSTIC SIGNALS IN NONGAUSSIAN INTERFERENCE ENVIRONMENTS Contractor Report, 18 Jun. 1982 - 18 May 1983
D. Middleton 18 May 1983 171 p
(Contract N66001-82-C-0322)
(AD-A140620; NOSC-CR-231) Avail: NTIS HC A08/MF A01 CSCL 20/1

In addition to the general development of a weak-signal M-sensor detection theory, optimum (binary) space-time threshold signal detection algorithms are obtained for specific (Class A) nongaussian underwater acoustic noise environments, as well as for the fully canonical cases of general interference and general signal waveforms. These include algorithms for coherent, incoherent, and composite (coherent + incoherent) reception. It is shown that spatial and temporal processing are interchangeable as long as sampling (of the noise data) is statistically independent, in time and in space (i.e., sparse sampling). It is also estimated that dense sampling - continuous or analog sampling - can give only O(2-3db) improvement over sparse-sampling in the highly nongaussian (Class A) cases, and O(0 db) in gauss noise, as long as large space-time-bandwidth products ($J>>1$) are employed. Comparisons in structure and performance with suboptimum detectors (matched-filter detectors and clipper-correlators) are provided, with an extensive set of numerical examples illustrating performance for typical noise and signal conditions. While clipper correlators give noticeable improvement O(20-30 db) over the conventional matched-filter receivers (optimum in gauss noise) in these threshold cases, they also can be significantly less effective O(6-10 db) than the optimum algorithm, even when composite detectors are employed. In all cases, increasing the number of independent spatial samples (array processing gain, $M>1$) over the single-element, or single-beam configurations ($M=1$), when possible, can give significant improvement in performance. GRA

N84-27549# Naval Underwater Systems Center, New London, Conn.
TRISTEN/FRAM IV ARCTIC AMBIENT NOISE MEASUREMENTS
R. J. Nielsen, F. R. DiNapoli, M. P. Fecher, N. P. Fisch, and D. M. Potter 26 Mar. 1984 16 p Presented at the 106th Meeting of the Acoust. Soc. of Am. San Diego, Calif., 7-11 Nov. 1983
(AD-A140656; AD-F300411; NUSC-TD-7133) Avail: NTIS HC A02/MF A01 CSCL 20/1

Multichannel ice camp ambient noise data were recorded by NUSC during the TRISTEN/FRAM IV experiment in the Barents Abyssal Plain, Arctic Ocean during April 1982. Single-hydrophone data were recorded from various elements of both the Massachusetts Institute of Technology/Woods Hole Oceanographic Institute horizontal array and the Naval Research Laboratory vertical array. This paper characteristics the average ambient noise level and its variance as a function of frequency (to 2500 Hz), depth, and time. GRA

N84-27550# Texas Univ., Austin. Applied Research Lab.
ACOUSTIC ATTENUATION IN OCEAN SEDIMENTS FOUND IN SHALLOW WATER REGIONS Technical Report
K. C. Focke 29 Feb. 1984 71 p
(Contract N00014-82-K-0015)
(AD-A140869; ARL-TR-84-6) Avail: NTIS HC A04/MF A01 CSCL 20/1

The acoustic attenuation in ocean sediments is a major loss mechanism for low frequency acoustic propagation in shallow water regions. Analysis of measured propagation in these regions has generally included estimates of the attenuation in the sediment, without consideration of the variations in attenuation as a function of depth. It will be shown that these variations can have a significant impact on the standard estimates. A new procedure is then developed which provides estimates of the attenuation as a function of depth. This procedure is used to obtain attenuation depth profiles in three shallow water regions. These estimated profiles present characteristics observed in laboratory and in situ measurements. GRA

N84-27551# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
CONTRIBUTIONS TO THE THEORY OF SOUND PROPAGATION IN DUCTS WITH BULK-REACTING LINING
S. W. Reinstra 12 Oct. 1983 22 p refs Presented at 106th Acoust. Soc. of Am. Meeting, 7-11 Nov. 1983, San Diego, Calif.
(NLR-MP-83064-U) Avail: NTIS HC A02/MF A01

Sound propagation in cylindrical ducts lined with porous material (bulk absorbers) is analyzed. If the porous material is homogeneous, the sound field is built up of modes. If the properties of the liner vary slowly in axial direction, a pure modal solution is in general not possible, but the field can be described by modes of the homogeneous liner, of which the amplitudes and wave numbers vary in axial direction slowly with the liner (multiple scale solution). Where porous material is embedded in an annular structure of partitions, if the pitch of the partitions is small, the sound field in the liner is, per circumferential mode, decoupled from the duct field, and its effect acoustically can be described by an impedance (per circumferential mode). This quasi point-reacting boundary condition can be incorporated in calculation procedures for ducts with locally reacting lining. Author (ESA)

N84-27552# Technische Physische Dienst TNO-TH, Delft (Netherlands). Afdeeling Geluid.
STRUCTURE-BORNE SOUND TRANSFER FUNCTIONS OF A DUNLOP SUPER "D" FLEXIBLE MOUNTING
B. vanderGraaf 10 Jan. 1984 18 p refs
(Contract A81/KM/009)
(TPD-408.870/1; TDCK-78938) Avail: NTIS HC A02/MF A01

Static and dynamic tests were used to investigate a Dunlop Super "D" flexible mounting. Only minor differences are found between the sound transfer functions TFz,z and TFy,y in the frequency range up to the 500 Hz 1/3-octave band. Up to the 125 Hz 1/3-octave band the sound transfer function TFx,x is significantly (10 dB) lower than TFy,y and TFz,z. Above this frequency range TFx,x becomes predominant due to standing waves in the rubber parts of the mounting; TFx,x becomes approximately 20 dB stiffer above the 125 Hz 1/3-octave band. Super "D" shows almost identical sound transfer characteristics as the P7D3400lbs mounting of the same type and manufacturer, except for an absolute difference of 10 dB (factor 3.2) for a 2.5 times higher nominal load and a small difference in rubber hardness. Author (ESA)

N84-26874# Joint Publications Research Service, Arlington, Va.
MEASUREMENT OF FLUX DENSITY OF SOUND ENERGY Abstract Only
A. Ye. Vovk, S. P. Klimov, and V. V. Tyutekin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 40 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 67-68 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26926# Joint Publications Research Service, Arlington, Va.
EFFECT OF NONHOMOGENEITY ON NONLINEAR STABILIZATION OF ACOUSTIC VIBRATIONS IN HEAT EMITTING MEDIUM WITHIN BOUNDED VOLUME Abstract Only
A. P. Vorobyev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 30 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 4, Apr. 1983 p 3-8 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N84-27553# British Library Lending Div., Boston Spa (England).
INTERACTION OF HIGH-INTENSITY RADIATION WITH MATTER
V. N. Adrianov 29 Mar. 1984 12 p refs Transl. into ENGLISH from Izv. (USSR) p 77-82
(BLL-M-35558-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A detailed analysis is made of the set of physical processes occurring when a material is irradiated with a powerful stream of radiation, particularly a laser. The situation considered is that of a solid of known chemical composition, size and shape, situated in a gas at a known temperature and pressure. The beam of radiation falls on part of the surface, heating it. Equations are derived that can be used as a basis for a combined investigation of the complicated processes occurring under these conditions. Author

N84-27554# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE EFFICIENCY OF WOOD AS A PASSIVE SHIELD FOR PARTICLES AND PHOTONS OF 0.5 TO 4.6 MeV BETWEEN 940 AND 377 mb M.S. Thesis [EFICIENCIA DA MADEIRA COMO BLINDAGEM PASSIVA PARA PARTICULAS E FOTONS DE 0,5 A 4,6 MEV ENTRE 940 E 377 MB]
Odylio Denys deAguiar Oct. 1983 178 p refs In PORTUGUESE; ENGLISH summary
(INPE-2900-TDL/146) Avail: NTIS HC A09/MF A01

A pair of scintillators NaI(Tl) 4 inch x 4 inch, one completely shielded with 20 g/sq cm of high density wood (1.3 g/cubic cm and the other unshielded, was flown aboard a Bandeirante aircraft over the region of San Jose dos Campos up to an altitude of 25,000 feet (377 mb). The spectra of the detectors with and without the wood shield are similar, and the spectral indices indicate that they are a function of atmospheric depth in the range of 0.65 to 2.4 MeV. Between 2.4 and 4.6 MeV the shielded detector presents a counting rate which is 20% lower than the counting rate obtained by the unshielded detector. In this same energy range the counting rate of the shielded detector is equal to the counting rate of the unshielded detector located at an atmospheric depth 35 g/sq cm higher. The attenuation length showed a decrease with the energy in the 0.65 to 4.6 MeV range and an increase above this energy. This increase is probably due to the strong influence of muons and electrons in this range. Author

N84-27555# Zaragoza Univ. (Spain). Dept. de Optica.
STUDY ON THE INFLUENCE OF X-RAY FOCUS ON THE IMAGE QUALITY IN RADIOLOGICAL SYSTEMS Ph.D. Thesis [ESTUDIO DE LA INFLUENCIA DEL FOCO DE RX EN LA CALIDAD DE LA IMAGEN DE LOS SISTEMAS RADIOLOGICOS]
P. Esther Millan Cebrian Mar. 1983 190 p refs In SPANISH
Avail: NTIS HC A09/MF A01

Topics covered include: radiographic systems, transfer functions, X-ray focus, calibration, dimensional influences, microdensitometers, error analysis, reproducibility of results, numerical analysis, focal length, and imaging techniques. B.G.

N84-27556# Collaborative Planners, Inc., Cleveland Heights, Ohio.
SUPERCONDUCTIVITY FOR ELECTROMAGNETIC GUNS Final Report, 17 Sep. 1982 - 17 Sep. 1983
O. K. Mawardi Mar. 1984 85 p
(Contract DAAK10-82-C-0245)
(AD-A140665; AD-E401128; ARLCD-CR-83053) Avail: NTIS HC A05/MF A01 CSCL 20/3

This report deals with a feasibility study for an electromagnetic gun using superconducting components. The report discusses two questions. The first deals with an assessment of the applied superconductivity technology, while the second is concerned with two reference designs for coaxial accelerators making use of advanced energy transfer concepts. Impressive recent developments in the technology of cryogenic insulation and of liquid helium liquefiers, as well as, of commercially available super conductors makes it possible to construct superconducting pulsed power sources of very high efficiency and of remarkable compactness and low weight. Repetitive superconducting switches, together with superconducting storage inductors makes these pulsed sources very competitive with conventional sources in terms of reliability and time constant. The synchronous coaxial accelerators investigated in this report rely on a simple procedure that eliminates the need for switches. It is based on the concept of transferring the energy of the pulsed source to a transmission line. The driver coils are part of the transmission line. Consequently, as the pulse travels down the line, the coils are excited in sequence and in synchronism with the moving driven coil. Since the energy is transferred from the pulsed source to a transmission line which appears as a resistive load, the transfer efficiency is very high. Other features of the novel designs consist of maintaining the current in the driven coil to a very low value thus minimizing the problem of arcing at the brushes and in dealing with the high voltage required to drive the guns. GRA

N84-27557# Missouri Univ., Rolla. Center for Materials Research.
NEUTRON DIFFRACTION STUDIES OF SOME RARE EARTH-TRANSITION METAL DEUTERIDES Final Report, 15 Mar. 1980 - 15 Nov. 1983
W. J. James Apr. 1984 53 p
(Contract DAAG29-80-C-0084)
(AD-A140757; ARO-16881.7-MS) Avail: NTIS HC A04/MF A01 CSCL 07/2

Neutron diffraction studies of the ternary alloy system Y6(Fe1-xMnx)23 reveal that the unusual magnetic behavior upon substitution of Mn or Fe into the end members, is a consequence of atomic ordering wherein there is strong site preference of Mn for the f sub 2 sites and of Fe for the f sub 1 sites. In the Mn-rich compositions, Fe is found to have no spontaneous moments. Therefore, the long range magnetic ordering arises solely from Mn-Mn interactions. Upon substitution of Mn into the Fe-rich ternaries, the Fe moments are considerably reduced. Neutron diffraction studies of Y6Mn23D23 show that a transition occurs below 180K from a fcc structure to a primitive tetragonal structure, space group P4/mmm with the onset of antiferromagnetic ordering. The Mn moments are directed along the c-axis. The transition probably results from atomic ordering of the D atoms at low temperature which induces c axis magnetic ordering. The question of the appropriate space group of LaNi4.5Al0.5D4.5, P6/mmm or P3/m has been resolved by a careful refinement and analysis of neutron diffraction data. The preferred space group is P6/mmm. Neutron powder diffraction and thermal magnetization measurements on small single crystals of ErNi3, ErCo3, and ErFe3 (space group R3m) show that the magnetocrystalline properties are a consequence of competing local site anisotropies between the

two non-equivalent crystallographic sites of Er and two of the three non-equivalent sites of the 3d-transition metal. GRA

N84-27558# Wisconsin Univ., Madison. Dept. of Chemistry.
COLLISIONAL ENERGY TRANSFER IN HIGHLY VIBRATIONALLY EXCITED MOLECULES Summary Report, Jun. 1983 - May 1984
F. F. Crim 3 Apr. 1984 7 p
(Contract N00014-79-C-0415)
(AD-A140772) Avail: NTIS HC A02/MF A01 CSCL 20/8

Overtone vibration-laser double resonance measurements have provided new data on vibrational and rotational relaxation in HF(v = 2). These experiments determine the magnitudes of the total vibrational relaxation rate constants for HF(v = 1 and 2) as well as their temperature dependences. Detailed analysis yields the variation of the branching between competing V-V and V-TR pathways. Rotational relaxation data come from these measurements as well. The temporal evolution of individual rotational states observed in the double resonance studies provides level-to-level energy transfer rate constants when analyzed using an iterative fitting scheme which incorporates scaling relations among the rate constants. Author (GRA)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

No abstracts in this category.

74 OPTICS

Includes light phenomena.

N84-27559 Maryland Univ., College Park.
LIGHT SCATTERING MEASUREMENTS OF CRITICAL FLUCTUATIONS IN AN OPTICALLY THIN BINARY LIQUID SAMPLE Ph.D. Thesis
Ronald Burton Kopelman 1983 203 p
Avail: Univ. Microfilms Order No. DA8405672

The dynamic structure factor of the critical binary liquid mixture methanol and cyclohexane was measured in an optically thin sample cell. This measurement was made using light scattering and photon correlation techniques to study the decay rate of fluctuations in the one phase region. By loading the sample cell to within 0.07% of the critical concentration, data could be obtained to within temperatures as close as 3uk to the critical mixing temperature. In order to avoid multiple scattering corrections while approaching the critical mixing point, a sample cell with a 0.2 mm optical path length was used to keep the turbidity-path length product less than 0.10 throughout the region of interest. By approaching the critical point to within a reduced temperature of 1 X 10(-g) at scattering angles of 10 and 170 degrees, accurate correlation functions were obtained well inside of the critical region where the scale scattered wavevector becomes as large as 1000. The data could then be compared with self consistent mode-mode coupling predictions for the decay rate. Dissert. Abstr.

N84-27560# Arizona Univ., Tucson. Optical Sciences Center.
INNOVATIVE RESEARCH IN THE DESIGN AND OPERATION OF LARGE TELESCOPES FOR SPACE: ASPECTS OF GIANT TELESCOPES IN SPACE
J. R. P. Angel, J. M. Beckers, W. F. Hoffmann, J. T. McGraw, R. E. Parks, H. S. Stockman, and N. J. Woolf [1982] 7 p refs
Avail: NTIS HC A02/MF A01

Eight areas of research on large space telescopes are identified and discussed. Telescope mirror technology in particular is addressed. Among the research topics described are: mirror substrates, physical optics, geometrical optics, optical surfaces, imagers, spacecraft guidance, and fiber optics. R.S.F.

N84-27561# IBM Norway, Oslo.
INFRARED PHOTOTHERMAL RADIOMETRY
A. C. Tam 10 Apr. 1984 17 p
(Contract N00014-83-C-0170)
(AD-A140562; TR-7) Avail: NTIS HC A02/MF A01 CSCL 20/6

Infrared Photothermal Radiometry (IPTR) is a sensitive technique for noncontract spectroscopy and inspection. A modulated beam of photons (or other particles) produces temperature transients in a sample; the corresponding transients in the infrared thermal radiation emitted from the sample are analyzed. This can provide absolute absorption coefficients, as well as information on thermal diffusivity, layered structure, and dimensions. Variations of IPTR are possible with continuously-modulated or pulsed excitation, and with transmission or back-scattering detection. These variations are reviewed. The recent technique of pulsed IPTR with back-scattering detection is described in more detail, and some important single-ended remote sensing applications are discussed. Author (GRA)

N84-26588# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
OVERVIEW OF HUD (HEAD-UP DISPLAY) OPTICAL DESIGNS
R. D. Lee *In* Aerospace Medical Research Labs. Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 4-10 (For primary document see N84-26587 17-01)
(AD-P003157) Avail: NTIS HC A05/MF A01 CSCL 01/3

N84-26589# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
MEASUREMENT OF HUD (HEAD-UP DISPLAY) OPTICAL QUALITY
H. L. Task *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 11-19 (For primary document see N84-26587 17-01)
(AD-P003158) Avail: NTIS HC A05/MF A01 CSCL 01/3

N84-26590# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
OPTICAL INTERACTIONS OF AIRCRAFT WINDSCREENS AND HUDS (HEAD-UP DISPLAYS) PRODUCING DIPLOPIA
L. V. Genco *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 20-27 (For primary document see N84-26587 17-01)
(AD-P003159) Avail: NTIS HC A05/MF A01 CSCL 01/3

N84-26591# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
SUN/MOON CAPTURE EVALUATION
W. Wilson *In* Aerospace Medical Research Labs. Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems 15 Dec. 1983 p 28-30 (For primary document see N84-26587 17-01)
(AD-P003160) Avail: NTIS HC A05/MF A01 CSCL 01/3

N84-26635# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
OPTICAL EFFECTS OF F-16 CANOPY-HUD (HEAD-UP DISPLAY) INTEGRATION
H. L. Task *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures Dec. 1983 p 808-824 (For primary document see N84-26596 17-01)
(AD-P003222) Avail: NTIS HC A08/MF A01 CSCL 01/3

N84-27239# Joint Publications Research Service, Arlington, Va.
MOVEMENT MECHANISM OF SOLITARY SYNOPTIC EDDIES Abstract Only
V. A. Bogomolov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-004) 18 May 1984 p 71-72 Transl. into ENGLISH from Izv. Akad.

Nauk SSSR: Fiz. Atm. i Okeana (Moscow), v. 19, no. 12, Dec. 1983 p 1252-1258 (For primary document see N84-27177 17-42)
Avail: NTIS HC A05/MF A01

N84-26871# Joint Publications Research Service, Arlington, Va.
EFFECT OF CERTAIN GEOMETRICAL PARAMETERS ON METROLOGICAL CHARACTERISTICS OF MULTICHAMBER BLACK BODY Abstract Only
G. N. Tolstykh, V. N. Nalimov, and V. K. Vertushkin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 38 Transl. into ENGLISH from Izmeritelnaya Tekhn. (Moscow), no. 9, Sep. 1983 p 40-42 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N84-27562 Maryland Univ., College Park.
STUDIES OF SOME PLASMA INSTABILITIES IN SPACE PHYSICS Ph.D. Thesis
Hung Kit Wong 1983 192 p
Avail: Univ. Microfilms Order No. DA8405722

The excitation of extraordinary mode radiation with frequency close to the electron cyclotron frequency is investigated for a low density magnetized plasma which consists of an energetic electron component with a loss cone type distribution and a cold background electron component. The electron cyclotron maser instability for a high density plasma in which the plasma frequency of the background electrons is comparable to the cyclotron frequency was investigated. The loss cone instability is applied to explain the generation of the auroral kilometric radiation. The effects of an electron temperature gradient on the lower hybrid drift instability in a high beta perpendicular shock was examined. Dissert. Abstr.

N84-27563 Maryland Univ., College Park.
MHD STABILITY OF THE SPHEROMAK Ph.D. Thesis
George J. Marklin 1983 104 p
Avail: Univ. Microfilms Order No. DA8405682

A variety of typical experimental spheromak equilibria are analyzed for their stability to Zero beta current driven ideal MHD modes. Both internal and free boundary modes are considered. For free boundary modes the exterior for region is treated as vacuum or as conducting plasma, which produces line tying. Both analytical and numerical techniques are employed, but most calculations use 2-D equilibrium and stability codes which were developed. The force-free Taylor equilibrium in cylindrical geometry is stable to internal tilting when the length is less than 1.68 times the radius. A large aspect ratio analytical model is used to show that equilibria with peaked current profiles or large flux holes are stable to free boundary kink modes when the q value on axis is greater than 1.2/n. The computer codes are used to examine free boundary modes in more general spheromak configurations. Dissert. Abstr.

N84-27564 Royal Inst. of Tech., Stockholm (Sweden). Unit of Accelerator Technology.
PUBLICATIONS FROM THE DEPARTMENT OF PLASMA PHYSICS AND THE UNIT OF ACCELERATOR TECHNOLOGY: INDEX AND ABSTRACTS, 1983
1983 16 p refs
(TRITA-EPP-83-10; ISSN-0348-7539) Avail: Issuing Activity

Over 30 publications concerning plasma physics, including space plasmas; astrophysics; and auroras are listed. Author (ESA)

N84-27565# Nagoya Univ. (Japan). Inst. of Plasma Physics.
INTRODUCTION TO THE THEORY OF FLUID AND MAGNETO-FLUID TURBULENCE
David Montgomery (William and Mary Coll., Williamsburg, Va.) Mar. 1984 145 p refs Lectures presented at Nagoya, Japan, Jun. 1983
(IPPJ-670) Avail: NTIS HC A07/MF A01

Magnetohydrodynamic turbulence is discussed from the perspective of classical flow theory and fluid dynamics. A detailed mathematical treatment of fluid turbulence is presented, with particular emphasis upon solutions to the Navier-Stokes equation and Orr-Sommerfeld equations. Laminar flow, incompressible flow, Couette flow, shear flow, flow velocity, critical velocity, and velocity distribution are among the parameters of fluid dynamics addressed herein. R.S.F.

N84-27566# JAYCOR, Alexandria, Va.
TRANSMISSION SYSTEM DEVELOPMENT FOR ELECTRON CYCLOTRON HEATING EXPERIMENTS OF A TOKAMAK PLASMA Final Report, 13 May 1981 - 12 Jul. 1982
J. S. Levine 2 Apr. 1984 48 p
(Contract N00014-81-C-2218)
(AD-A140688; JAYCOR-J206-84-007/6213) Avail: NTIS HC A03/MF A01 CSCL 09/5

The heating of Tokamak plasmas by microwaves at electron cyclotron frequency has been the subject of investigation for several years by several groups including the Naval Research Laboratory (NRL). To enable electron cyclotron heating (ECH) to produce significant temperature increases, the incident microwave power must be as strong as, or stronger than, the ohmic heating power required for the Tokamak discharge. However, ECH experiments are limited to the current available microwave power. To address the issue of microwave power, NRL designed, built and tested a high power (approx. 300 kW) gyrotron for operation at a 1 microsec pulse length. In order to use this source for ECH experiments, a transmission system was designed and built that polarized the microwaves for optimal heating efficiency and coupled them into the Tokamak plasma with minimal loss. The development of the transmission system is the topic of this final report. The report consists of two parts. First is a paper describing the subject of rippled wall mode converters for circular waveguides. The second part is a compilation of the engineering drawings developed for the construction of the antenna or transmission system. GRA

N84-27567# Fom-Instituut voor Plasmafysica, Jutphaas (Netherlands).
TRANSPORT OF DEUTERIUM, TRITIUM AND HELIUM IN A TOKAMAK
J. H. H. M. Potters Feb. 1984 88 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-84-150) Avail: NTIS HC A05/MF A01

A one-dimensional numerical model for determining steady-state radial profiles of the densities of the particles, including neutrals, in a multispecies toroidal plasma is described. The model is applied to deuterium-tritium plasmas without and with a helium admixture. For equal densities of deuterons and tritons in the plasma center, the neutral tritium density in front of the wall is 1.3 to 1.6 times higher than that of deuterium, depending on the plasma density, the temperature profile and the transport model. Pumping neutral helium, originating from fusion alpha particles, out of a cold plasma/gas blanket surrounding the hot plasma is not feasible, as the helium gas density, corresponding to a relative abundance of alpha-particles in the plasma core below 10%, is very low. Although depending strongly on the ion transport model and increased by elastic collisions between neutral helium and charged hydrogen isotopes, the neutral helium enrichment ratio is always much less than unity. Author (ESA)

N84-27568# Fom-Instituut voor Plasmafysica, Jutphaas (Netherlands).
SOFT X-RAY ELECTRON TEMPERATURE MEASUREMENTS ON TORTUR
N. J. Lopes Cardozo Feb. 1984 33 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-84-151) Avail: NTIS HC A03/MF A01

Soft X-ray (SXR) measurements of electron temperature (Te) were carried out during Tokamak discharges, using the absorber foil technique. The high SXR-flux and low Te suggest that the plasma is formed during the predischarge out of a clean filling gas. Directly after the formation, oxygen is released from the liner, by radiation or heating, or both. The oxygen diffuses into the plasma, but a gradient is maintained. Oxygen contamination causes the electron density profile to broaden and strongly enhances the SXR emission. Although the amount of oxygen to account for the high flux is > 50% of the ion density at the limiter, the total power radiated by oxygen is only 10% of the total power input. The measured loop voltage cannot be explained by classical resistivity and strong oxygen contamination. Anomalous resistivity would produce reasonable j and q profiles. Author (ESA)

N84-27569# Fom-Instituut voor Plasmafysica, Jutphaas (Netherlands).
ELECTROSTATIC DRIFT MODELS IN TOROIDAL GEOMETRY
M. Venema and T. J. Schep Mar. 1984 46 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-84-152) Avail: NTIS HC A03/MF A01

Toroidicity induced drift modes in collisionless plasma were investigated. Ion magnetic drift resonant effects were fully retained, also in the ion sound contribution. It is shown that the modes with the least number of nodes between turning points are localized at the outside of the torus within the poloidal interval (-pi, pi). Their amplitudes vanish before the magnetic drift resonance is actually reached. The lowest even mode becomes unstable due to the inverse Landau damping of circulating electrons. The nonadiabatic response of trapped electrons causes a decrease of the mode frequency. Author (ESA)

N84-26828# Joint Publications Research Service, Arlington, Va.
COLLECTIVE MODE OF EVOLUTION OF PLASMA PRODUCED BY OPTICAL BREAKDOWN IN AEROSOL MEDIUM Abstract Only
V. A. Vdovin and Yu. M. Sorokin *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 6 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1220-1226 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26931# Joint Publications Research Service, Arlington, Va.
MAGNETOHYDRODYNAMIC FLOW PAST NONCONDUCTING WEDGE Abstract Only
Ye. A. Pushkar *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1983 p 33 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Zhidkosti i Gaza (Moscow), no. 2, Feb. 1983 p 102-112 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N84-27570# British Library Lending Div., Boston Spa (England).
CRYSTALLOGEOMETRIC ANALYSIS OF COMPATIBILITY OF CARBON-METAL MATERIALS
A. N. Vaernkov and E. I. Isaev 29 Mar. 1984 5 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Met. (USSR), no. 7, 1983 p 82-84
(BLL-M-35559-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Characteristics of the crystallogeometric correspondence of components of heterogeneous carbon-metal materials were examined. The possibility of constructing a transition zone between the different components on the basis of the best conjugation of lattices is demonstrated. Author

N84-27571*# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
RADIAL SEGREGATION INDUCED BY NATURAL CONVECTION AND MELT/SOLID INTERFACE SHAPE IN VERTICAL BRIDGMAN GROWTH
Chiechun J. Chang and Robert A. Brown [1983] 66 p refs Submitted for publication Sponsored by NASA
(NASA-CR-173627; NAS 1.26:173627) Avail: NTIS HC A04/MF A01 CSCL 20B

The roles of natural convection in the melt and the shape of the melt/solid interface on radial dopant segregation are analyzed for a prototype of vertical Bridgman crystal growth system by finite element methods that solve simultaneously for the velocity field in the melt, the shape of the solidification isotherm, and the temperature distribution in both phases. Results are presented for crystal and melt with thermophysical properties similar to those of gallium-doped germanium in Bridgman configurations with melt below (thermally destabilizing) and above (stabilizing) the crystal. Steady axisymmetric flow are classified according to Rayleigh number as either being nearly the growth velocity, having a weak cellular structure or having large amplitude cellular convention. The flows in the two Bridgman configurations are driven by different temperature gradients and are in opposite directions. Finite element calculations for the transport of a dilute dopant by these flow fields reveal radial segregation levels as large as sixty percent of the mean concentration. Segregation is found most severe at an intermediate value of Rayleigh number above which the dopant distribution along the interface levels as the intensity of the flow increases. B.W.

N84-27572# Texas Univ., Austin. Dept. of Chemistry.
THIN FILM MODELS OF SMSI (SHOW STRONG METAL-SUPPORT INTERACTIONS) CATALYSTS: Pt ON OXIDIZED TITANIUM Technical Report, 1 Jan. - 31 Dec. 1983
D. N. Beltyon, Y. M. Sun, and J. M. White 17 Oct. 1983 29 p Submitted for publication
(Contract N00014-75-C-0922; NR Proj. 056-578)
(AD-A140569; TR-30) Avail: NTIS HC A03/MF A01 CSCL 20/12

Thin films of Pt, vapor deposited on an oxidized Ti foil, have been utilized as models of high surface area Pt/TiO2 catalysts which show strong metal-support interactions (SMSI). Both fully oxidized (Ti(4+)) and partially reduced (significant amounts of Ti(3+)) surfaces were studied. As a function of Pt coverage, the development of bulk Pt chemisorption characteristics occurs at significantly lower coverages on the oxidized substrate. In particular, at a given Pt coverage there is less chemisorption of both CO and H2 on the reduced, as compared to the oxidized, TiO2 and the desorption spectra peak at lower temperatures. No evidence for significant differences in the chemical state of the Pt is found by XPS and AES. We propose a model, consistent with earlier work on high surface area Pt/TiO2 catalysts, in which the morphology of the Pt on the reduced catalysts is significantly flatter (dominated by (111) terraces) and is slightly modified electronically, as compared to the oxidized sample. GRA

N84-27573# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
ANOMALIES IN, AND CRYSTALLIZATION OF SUPERCOOLED WATER AND AQUEOUS SOLUTIONS Final Report
C. A. Angell Mar. 1984 13 p
(Contract N00014-78-C-0035)
(AD-A140582) Avail: NTIS HC A02/MF A01 CSCL 20/2

This report summarizes research work performed under ONR auspices during the period 1978-1983. Thermodynamic studies of pure water and various aqueous solutions containing simple molecular second components such as H2O2N2H4 and formamide have been performed at temperatures down to -120 C, in order to perform extrapolations to obtain properties of normal water, i.e. water free from anomalous structure fluctuations. Properties studied have been heat capacity, expansivity and

compressibility. On certain of these solutions, viscosity and also dielectric relaxation studies have been performed. Spectroscopic measurements in both the far infrared, and the near infrared, have yielded information on vibrational modes and characteristic hydrogen bonding structures. All together these measurements have done much to elucidate the anomalous behavior of water in the supercooled regime. GRA

N84-27574# Harry Diamond Labs., Adelphi, Md.
CRYSTAL-FIELD SPLITTINGS OF THE HUND GROUND STATES OF ndN IONS IN S4 SYMMETRY: THEORY AND APPLICATION TO THE Ga-3+ Gd-3Sc-2Ga-3O-12
C. A. Morrison and R. P. Leavitt Mar. 1984 26 p
(DA Proj. 1L1-61102-A-31-B)
(AD-A140623; HDL-TR-2040) Avail: NTIS HC A03/MF A01 CSCL 20/8

We discuss the use of the weak-field approximation and the point-charge model to calculate the splittings of the Hund ground states of nd superscript N ions (1 less than N less than 9) in S4 symmetry. The host crystal chosen as an illustration is Gd3Sc2Ga3O12 gadolinium scandium gallium garnet-GSGG); in this crystal, the nd superscript N ions enter the Ga(3+) sites substitutionally. Lattice sums A sub nm are reported for the Ga(3+) site, and crystal-field-parameters, B sub nm, and energy levels are given for 29 ions with N = 1 to 9. The results of the calculations are discussed for each ion considered. Author (GRA)

N84-27575# Rutgers - The State Univ., Piscataway, N. J. Dept. of Mechanics and Materials Science.
PIEZOELECTRIC PROPERTIES AND FERROELECTRIC HYSTERESIS EFFECTS IN UNAXIALLY STRETCHED NYLON-11 FILMS
S. C. Mathur, J. I. Scheinbeim, and B. A. Newman 12 Apr. 1984 32 p
(Contract N00014-80-0795)
(AD-A140683; TR-4) Avail: NTIS HC A03/MF A01 CSCL 11/5

Uniaxilly stretched Nylon-11 films (obtained by melt-pressing and quenching in ice-water, were poled up to 900 KV/cm at 75 deg C for 30 min. Both piezoelectric strain constant, d sub 31, and piezoelectric stress constant, e sub 31, were found to increase with poling fields. The values reach a plateau at fields of 800 KV/cm. Under identical poling conditions (500 KV/cm; 75 deg C) d sub 31 was found to be approx. 25% greater than that observed for unoriented films in previous studies while the value for e sub 31 was found to be approx. 85% greater than that for the unoriented films. Static switching experiments were conducted for uniaxially stretched Nylon-11 films, initially prepared by quenching or slow cooling from the melt. Both films exhibited ferroelectric hysteresis behavior in d sub 31 and e sub 31 indicating that both the quenched and slow cooled points of Nylon-11 are ferroelectric. X-ray diffraction studies for the plasticized and uniaxially stretched slow cooled films indicate that the crystallites may be reorienting in a way consistent with dipole alignment in field direction. Author (GRA)

N84-27576# Dayton Univ., Ohio.
PROCEEDINGS OF THE 5TH SYMPOSIUM ON APPLIED SURFACE ANALYSIS Final Report, 1 Apr. - 31 Dec. 1983
J. T. Grant Apr. 1984 61 p Proc. held in Dayton, Ohio, 8-10 Jun. 1983
(Contract N00014-83-G-0068)
(AD-A140744; AD-F300417; UDR-TR-84-36) Avail: NTIS HC A04/MF A01 CSCL 07/4

The 5th Symposium on Applied Surface Analysis was held at the University of Dayton, 8-10 June 1983. This Symposium was held to meet a need, namely to show the transition between basic surface science research and applications of this research to areas of Department of Defense interest. Areas receiving special attention at this Symposium were chemical bonding and reactions at metal-semiconductors interfaces, surface analysis and the tribological processes of ion implanted materials, microbeam analysis and laser ionization of sputtered neutrals. Other topics discussed included adsorption, adhesion, corrosion, wear and thin films. Approximately 110 scientists active in the field of surface analysis participated in the Symposium. Four scientists presented invited papers at the Symposium. There were 29 contributed presentations. The proceedings of the Symposium are being published in a special issue of the journal, Applications of Surface Science, by North-Holland Publishing Company. GRA

N84-27577# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
DEVELOPMENT OF FT-IR ATTENUATED TOTAL INTERNAL REFLECTION DICHROISM TECHNIQUES FOR STRUCTURAL CHARACTERIZATION OF POLYMER SURFACES
C. S. P. Sung and J. P. Hobbs 17 Apr. 1984 49 p
(Contract N00014-78-C-0676)
(AD-A140805; TR-6) Avail: NTIS HC A03/MF A01 CSCL 07/3

We describe our continuing effort to develop FT-IR attenuated total reflection (ATR) dichroism techniques for the characterization of polymer surface structure and molecular orientation. Following theoretical background, we review the two-dimensional and three-dimensional analyses work based on a specially designed internal reflection crystal and a specially built ATR-sample attachment. In the current development section, we describe briefly the intensity correction procedures used in variable angle studies and an attempt to design a hemispheric crystal attachment to eliminate problems encountered with face-cut reflection crystals. GRA

N84-27578# Westminster Coll., Fulton, Mo.
OPTICAL CONSTANT DETERMINATION OF THIN FILMS CONDENSED ON TRANSMITTING AND REFLECTING SUBSTRATES Final Report, 1 Oct. 1982 - 30 Sep. 1983
K. F. Palmer and M. Z. Williams Arnold AFS, Tenn. AEDC May 1984 60 p
(AD-A140845; AEDC-TR-83-64) Avail: NTIS HC A04/MF A01 CSCL 20/12

In this report, a new subtractive Kramers-Kronig computer program is described which can obtain accurate optical constants of a uniform thin film on a thick substrate using only the transmittance measurements of a single-film thickness. Preliminary results from existing data show that the optical properties of a dielectric film may depend, to a small degree, upon the thickness of the film. This effect seems to be more noticeable in films containing molecules, such as H2O and NH3, which readily form hydrogen bonds. Also described are two methods for extracting the optical constants of a dielectric thin film from measurements of the reflectance of a beam incident in a vacuum upon a film layer on a metal substrate. In one method, the dependence is observed of the reflectances of several thicknesses of the same film material upon its thickness. This method contains the assumption that the optical properties of a film material do not vary with changes in film thickness. The second method does not depend on this assumption. It uses the reflectance spectrum of a single-film thickness to compute the optical constants of the film from a dispersion relation. Author (GRA)

N84-27579# Nancy Univ. (France).
LOW TEMPERATURE STRUCTURE AND PROPERTIES OF GRAPHITE LAMELLAR COMPOUNDS Final Report
D. Guerard, A. Herold, M. Lelaurain, and E. McRae 1984 40 p
(Contract DAJA37-81-C-0045)
(AD-A140875; AD-E500637) Avail: NTIS HC A03/MF A01 CSCL 20/2

The main initial objective of this E.R.O. supported research was a better understanding of the relationships between the structure and certain electronic properties of graphite intercalation compounds (GIC's) which might lead to the synthesis of compounds with a high electrical conductivity. In order to achieve this, three kinds of research were developed (1) Much time was devoted to preparing samples of pure compounds, without macroscopic defects such as cleavages or curvatures, and with a mosaic spread as low as possible. (2) X-ray methods have been set up which permit a quantitative study of the defects in the compounds at room temperature and allow following the change in the structure

from 300 K to about 10 K especially the variation of the identity period along the c axis perpendicular to the graphite sheets. (3) The in-plane electrical resistivity of several compounds was measured as a function of both stage and temperature, by using a contactless inductive method. GRA

N84-27580# Brown Univ., Providence, R. I. Materials Research Lab.
MATERIALS RESEARCH LABORATORY REPORT Annual Technical Report, 1 Jul. 1982 - 30 Jun. 1983
30 Jun. 1983 64 p
(Grant NSF DMR-79-235702)
(AD-A140898) Avail: NTIS HC A04/MF A01 CSCL 20/12

Partial Contents: Plasticity of Solids; Fracture of Solids; Inorganic Glasses; Solid Surfaces; Lower Dimensionality Materials and Structures; and Properties of Materials at Low Temperatures; Materials for Solar Energy Conversion. GRA

N84-27581# Naval Postgraduate School, Monterey, Calif.
COMPUTER SIMULATION STUDIES OF SPUTTERING FROM CLEAN TUNGSTEN AND NITROGEN REACTED TUNGSTEN AND MOLYBDENUM SURFACES M.S. Thesis
D. Meyerhoff Dec. 1983 85 p
(AD-A140900) Avail: NTIS HC A05/MF A01 CSCL 20/12

The Naval Postgraduate School computer simulation model QRAD was used to study sputtering from clean and nitrogen reacted tungsten, and from nitrogen reacted molybdenum, for (001) surfaces bombarded by normal incidence argon ions in the energy range from 0.5 keV to 3.0 keV. The simulation results are compared to experimental data obtained by Winters, who concludes, that the difference in the cross sections for the sputtering of nitrogen from W(001) and Mo(001) is dominated by the adsorbate-substrate mass difference since the other important parameters are similar. The simulation, however, shows little dependence on the substrate mass, but a strong dependence of the sputtering cross sections on the distance of the adatoms above the substrate. The nitrogen position is required to be higher on tungsten than on molybdenum. Author (GRA)

N84-27582# North Carolina State Univ., Raleigh. School of Engineering.
FUNDAMENTAL STUDIES OF GROWTH, DOPING AND TRANSFORMATION IN BETA SILICON CARBIDE Annual Letter Report
R. F. Davis and H. H. Stadelmaier 15 Mar. 1984 36 p
(Contract N00014-79-C-0121; RR0-2102)
(AD-A140924; NCSU-243-043-004) Avail: NTIS HC A03/MF A01 CSCL 07/2

Electronic quality beta - silicon carbide thin films grown by CVD on Si substrates have been implanted with B(+),AL(+),P(+) and N(+) ions or doped with B(+) and AL(+) during growth. Rapid thermal annealing or resistive heating of the implanted samples up to 1653 K for five minutes cause only modest activation of the charge carriers. Oxidation, plasma etching, electrical characterization and preparation for device fabrication have also been conducted. Author (GRA)

N84-26861# Joint Publications Research Service, Arlington, Va.
VARIATION OF CARRIER CONCENTRATION CAUSED BY BAND STRUCTURE RECONSTRUCTION IN TELLURIUM AND TIN-DOPED Al(x)Ga(1-x)As SOLID SOLUTIONS Abstract Only
M. A. Malyshkin, D. V. Galchenkov, M. A. Grankin, S. A. Bondar, and V. N. Vigdorovich *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-0070 29 May 1984 p 32 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1748-1751 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26862# Joint Publications Research Service, Arlington, Va.
THE 1/f NOISE IN CONDITIONS OF HIGH GEOMETRICAL MAGNETORESISTANCES Abstract Only
M. Ye. Levinshteyn and S. L. Rumyantsev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 32-33 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1830-1834 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26863# Joint Publications Research Service, Arlington, Va.
NONLINEAR TRANSMISSION OF LASER RADIATION BY ZnTe MONOCRYSTALS AT HELIUM TEMPERATURES Abstract Only
V. A. Zyulkov, V. P. Gribkovskiy, V. A. Ivanov, and M. A. Katibnikov *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 33 Transl. into ENGLISH from Fiz. i Tekhn. Poluprov. (Leningrad), v. 17, no. 10, Oct. 1983 p 1893-1896 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

N84-26864# Joint Publications Research Service, Arlington, Va.
COMPLEMENTED SCHARFETTER-GUMMEL CONDITION Abstract Only
A. I. Prokopyev *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 33-34 Transl. into ENGLISH from Radiotekhn. i Elektron. (Moscow), v. 28, no. 11, Nov. 1983 p 2297-2298 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N84-27583 Harvard Univ., Cambridge, Mass.
TOPICS IN QUANTUM FIELD THEORY AND COSMOLOGY Ph.D. Thesis
Robert Hans Brandenberger 1983 251 p
Avail: Univ. Microfilms Order No. DA8402981

A study of topics in quantum field theory and cosmology in the context of the new inflationary universe scenario is contained. A review of the quantum field theory methods used in the new cosmological models is presented. A detailed study of energy density fluctuations in the early universe is applied. Hawking radiation is derived as the source of initial perturbations in two complementary ways. A new gauge invariant framework is presented to study the growth of fluctuations outside the horizon. This framework is applied to the new inflationary universe in the final chapter. The introduction gives a brief outline of the new cosmological models. Dissert. Abstr.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N84-27584 Indiana Univ., Bloomington.
THE EFFECTS OF TASK VARIABILITY, SENSORY REINFORCEMENT, AND MONETARY REINFORCEMENT ON PERFORMANCE, SATISFACTION, AND INTRINSIC MOTIVATION Ph.D. Thesis
Jung-Lih Farh 1983 167 p
Avail: Univ. Microfilms Order No. DA8406793

While it was recognized that task performance and self reports of satisfaction are a function of the manner in which the task is designed, few researchers have demonstrated the effects of task design on task behavior through systematic manipulation of task properties. Two important task properties - task variability and sensory reinforcement - were systematically varied, and their effects on task behavior under various monetary reward contingencies

were examined. The results showed that both task variability and sensory reinforcement increased satisfaction and intrinsic motivation. The offer of monetary rewards, however, did not have an effect on satisfaction or intrinsic motivation. Moreover, it was found that the piece-rate subjects performed at a higher rate than the unexpected reward subjects. In addition, sensory reinforcement was found to decrease performance in early trials. Finally, the performance satisfaction relationship was found to be moderated by task variability as well as sensory reinforcement. The results are discussed in terms of their relevance for task design as well as current theories of job motivation. Dissert. Abstr.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N84-27585# Naval Postgraduate School, Monterey, Calif.
THE DECISION FOR THE OPTIMAL PRICE IN COMPETITIVE BIDDING: THE CASE OF A KOREAN CONSTRUCTION COMPANY M.S. Thesis
Y. Y. Cha Dec. 1983 65 p
(AD-A140556) Avail: NTIS HC A04/MF A01 CSCL 05/1

During recent years, there has been a surprisingly large amount of bidding for overseas projects, especially in the Middle East area. This boom has contributed to the economic development of Korea. But unfortunately, the theoretical and practical studies of these fields are still unsatisfactorily developed. Also the recognition of the scientific factors in the pricing problems by the decision makers is not complete. So, to be successful in this field, management must concentrate their efforts on improving the management system. The purposes of this thesis are; first, to provide a method of determining an optimal competitive bid by a scientific approach, and second, bidding to provide a total system including effectiveness, competitiveness and efficiency. The model presented here can certainly be a powerful and effective tool for competitiveness. Author (GRA)

N84-27586# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
FY 1985 TECHNICAL OBJECTIVE DOCUMENT
Mar. 1984 75 p Supersedes AFWAL-TR-83-2001
(AF Proj. 9991)
(AD-A140581; AFWAL-TR-2000; AFWAL-TR-83-2001) Avail: NTIS HC A04/MF A01 CSCL 21/5

This TOD was prepared by the Aero Propulsion Laboratory to provide science and industry with specific technical objectives which the Air Force feels are critical to maintain aerospace superiority in the future. The TOD contains eight technology planning objectives which cover the technical disciplines of air-breathing propulsion, aerospace vehicle power, fire protection, and aircraft and missile fuels and lubrication. GRA

N84-27587# Naval Postgraduate School, Monterey, Calif.
CONTRACT AUDIT FOLLOWUP: ITS IMPACT ON DEFENSE CONTRACTING M.S. Thesis
D. V. Smith Dec. 1983 116 p
(AD-A140627) Avail: NTIS HC A06/MF A01 CSCL 05/1

Department of Defense Directive 7640.2 Policy for the Followup of Contract Audit Reports, has created controversy both within DoD and the defense industry. Critics have claimed that the policy causes a fundamental shift in the relationship between the contracting officer and contract auditor, strengthening the auditor's role while eroding the independence and authority of the contracting officer. The available literature on the policy is highly subjective and consists primarily of the assertions of top management, both in government and industry, either supporting or denouncing the policy. The primary purpose of this study was to objectively investigate the specific claims of critics and to explore the overall impact of the followup policy on defense procurement. The thesis is based on an analysis of data collected from interviews of procurement managers, contracting officers, and auditors within the state of California and telephone discussions with procurement professionals nationwide. GRA

N84-27588# Analytics, Inc., Dayton, Ohio.
INCREASING COMPETITION FOR SPARES WITHIN AFLC (AIR FORCE LOGISTICS COMMAND) Interim Report, Jun. - Dec. 1983
Thomas McCann 30 Dec. 1983 110 p
(Contract F33615-82-C-5095)
(AD-A140751; BRMC-82-5095-4) Avail: NTIS HC A06/MF A01 CSCL 15/5

The research was motivated by the need to improve the competitive position of Air Force Logistics Command and focuses on data problems which decrease competition. The ability to successfully breakout an item requires data and data rights to define the physical and functional attributes of parts, manufacturing techniques, and other information that permits a competent source to produce the part. Part 4 reviews information uncovered in Phase 2 and 3 and outlines recommendations concerning data rights, data management, management planning, and economic analysis done to complete an item. Author (GRA)

N84-27589# Office of Naval Research, San Francisco, Calif.
ONR (OFFICE OF NAVAL RESEARCH) FAR EAST SCIENTIFIC BULLETIN. VOLUME 9, NUMBER 1, JANUARY TO MARCH 1984 Quarterly Publication
S. Yamamoto and M. L. Moore Mar. 1984 184 p
(AD-A140826) Avail: NTIS HC A09/MF A01 CSCL 05/1

Articles covering developments in Far Eastern (particularly Japanese) scientific research are presented. Subject areas include superconductors, solid state physics, human factors in advanced displays, low temperature physics, uranium recovery, powder metallurgy, physiology, immunology, and noopsychosomatic medicine. GRA

N84-27590#. Ohio State Univ., Columbus. Dept. of Computer and Information Science.
REPORT ON THE FEASIBILITY OF DESIGNING EXPERT SYSTEMS FOR CONTRACT PRICE ANALYSIS Interim Report, 1 Oct. 1982 - 15 Jul. 1983
B. Chandrasekaran, J. Dillard, K. Ramakrishna, and T. Harrison 15 Jul. 1983 76 p
(Contract F33615-82-C-5114)
(AD-A140854; BRMC-82-5114-1/2) Avail: NTIS HC A05/MF A01 CSCL 06/4

This report identifies the knowledge base and support requirements for automated contract price analysis as an application area for expert systems technology. A theoretical, textbook based model of cost/price analysis is presented. A prototype design using the INFO system is presented and some problems with that design are identified. A brief survey of the educational environment and current computer support for price analysis in the Air Force is presented. Author (GRA)

N84-27591# Naval Postgraduate School, Monterey, Calif.
THE INTRODUCTION OF UNCERTAINTY TECHNIQUES TO THE PRODUCTIVITY INVESTMENT FUND M.S. Thesis
E. A. Lenio Mar. 1984 130 p
(AD-A140864) Avail: NTIS HC A07/MF A01 CSCL 05/1

Each year the Defense Productivity Program Office (DPPO) disburses funds for Productivity Investment Projects (PIFs). The purpose of these projects is to increase productivity within the Department of Defense (DOD). To enhance these efforts, DPPO requested a study to be conducted to determine if methods of risk or uncertainty will affect the results obtained by the current procedure. This study applies various principles of uncertainty to this procedure and examines their impact on the project rankings. A background of DPPO and PIFs is presented together with discussion of risk and uncertainty techniques, as well as the economic indicators used in ranking projects. A model is then explained which will introduce uncertainty into the present procedure. Results of the initial comparison and sensitivity analysis

is revealed. Conclusions are drawn based on these results and recommendations concerning alternate procedures and possible further research are presented. Author (GRA)

N84-27592# Naval Postgraduate School, Monterey, Calif.
CONTROL SYSTEMS M.S. Thesis
J. M. Martin Dec. 1983 56 p
(AD-A140901) Avail: NTIS HC A04/MF A01 CSCL 05/1

Managers are responsible for identifying the need for control and for designing control systems that are appropriate for each set of conditions. This thesis examines the nature of organizational control and discusses historical approaches to organizational control. Structural and behavioral control system theories are presented and analyzed. Four alternatives to control system design are documented and an approach to control system design is offered. Author (GRA)

N84-27593# Technische Hochschule, Aachen (West Germany). Schriften zur Informatik und Angewandten Mathematik.
STOCHASTIC BOUNDS ON DISTRIBUTIONS OF OPTIMAL VALUE FUNCTIONS WITH APPLICATIONS TO PERT, NETWORK FLOW AND RELIABILITY
Gideon Weiss (Tel Aviv University) Oct. 1982 27 p refs Sponsored by DAAD
(Rept-81) Avail: NTIS HC A03/MF A01

Networks or general clutters with nodes 1,...,n, paths I1,...,Ik, cuts J1,...Jl, and with random weights X1,...,Xn possessing marginal distributions F1,...,Fn are considered. For the optimal value functions M, L, and T, (critical path length, the maximal flow and the system lifetime) random variables such that M bar sup is convexly larger, L bar sub concavely smaller, T bar sup (sub) stochastically larger (smaller) than M, L, T respectively, over all joint distributions with the given marginals are constructed. These bounds are sharp and can be obtained by solving relatively easy mathematical programs. Author (ESA)

N84-27594# Norton (Kent K.), Garden Grove, Calif.
LAND USE PLANNING FOR SOURCES OF NONIONIZING ELECTROMAGNETIC RADIATION M.S. Thesis
Kent Kirkwood Norton 22 Apr. 1983 78 p refs Sponsored in part by California State Univ., Fullerton
(PB84-156363) Avail: NTIS HC A05/MF A01 CSCL 05A

Findings on the public health impacts of nonionizing electromagnetic radiation (NEMR) are reviewed and their implications for local land use planning are discussed. Although the majority of U.S. residents are not exposed to significant levels of NEMR, local jurisdictions may wish to analyze and develop NEMR regulations based on their own conditions and regulatory needs. Domestic broadcasting, including AM/FM radio and television, represents the most significant source of urban NEMR exposure. Minor sources include private radio, fixed point to point microwave, amateur radio, radar, and high voltage electric power lines. Each NEMR source has unique operating characteristics, exposure levels, local land use constraints, and regulatory needs. Some localities already have NEMR regulations. Zoning is a readily accessible model for discussing NEMR land use controls. Technical information is included to calculate NEMR exposure. GRA

N84-27595 Missouri Univ., Columbia.
AN INVESTIGATION OF ORGANIZATIONAL CLIMATE: DEFINITION, MEASUREMENT, AND USEFULNESS AS A DIAGNOSTIC TECHNIQUE Ph.D. Thesis
Phillip R. Ash 1983 154 p
Avail: Univ. Microfilms Order No. DA8406168

An investigation is made of the relationships between personality and perception of organizational climate, as well as the relationships between level in the organization and perception of organizational climate. Also, evidence of an organization specific dimension of climate is investigated and measurement of this dimension attempted through the use of questionnaires. A more detailed investigation of two personal correlates of organizational climate personality and position in the organization is discussed. The EPPS personality characteristics - autonomy, dominance, and achievement - accounted for almost 22% of the variation in perceived organizational climate. Those managers with relatively high EPPS scores in the personality characteristics of achievement, aggression, autonomy, and dominance, were found to perceive their organizational climate to be comparatively negative. Managers with high scores in the personality characteristics of affiliation, succorance, and order were observed to perceive their organizational climate to be relatively positive. Dissert. Abstr.

N84-27596 Pennsylvania Univ., Philadelphia.
EVALUATING ORGANIZATIONAL CHANGE THROUGH IMPROVED UNDERSTANDING OF MANAGERIAL SCHEMATA Ph.D. Thesis
Peter Warren Howard 1983 508 p
Avail: Univ. Microfilms Order No. DA8406675

As organizational situations become increasingly complex, the essential connection between how researchers and managers interpret them becomes increasingly difficult to make. It is hypothesized that managerial schemata serve as the basis for understanding how managers perceive the success of planned organizational change and can reveal indices of success useful to managers but not necessarily obvious to researchers. These hypotheses are tested by applying the theoretical system to the application of an extensive Management By Objectives program in a large federal agency. Interview and survey data were gathered from seventy-two senior managers within sixteen different organizations in the agency to determine what issues were important from their perspectives for the success of the program and how the issues were related to one another. A model comparison approach is used to test the hypotheses and the extent to which managerial schemata do indeed exhibit rational and causal contraventions and yield useful indices of success for the MBO program. Dissert. Abstr.

N84-27597 Virginia Polytechnic Inst. and State Univ., Blacksburg.
AN ANALYSIS OF RELATIONSHIPS AMONG SIZE, TECHNOLOGY AND STRUCTURE IN A CONTEXTUALLY LIMITED SETTING Ph.D. Thesis
Joel Keeling Worley 1983 134 p
Avail: Univ. Microfilms Order No. DA8405948

For several years organization theorists have debated the magnitude of the impact of size and technology on dimensions of organization structure. Also, management theorists have shown the importance of structure on organization goal attainment. However, no consensus was reached concerning the interrelationship among size structure and technology. Apparently much of the disagreement among theorists is a result of mixing levels of analysis, inadequate specification of variables, use of inadequate or inappropriate research tools and lack of controls for potentially confounding variables. The purposes were: (1) to provide a better understanding of the complex interrelationships among size, technology and structure; (2) to use regression analysis in an effort to better depict the relationships among those variables; and (3) to attempt to bridge some of the findings of other researchers that disagree among themselves. Dissert. Abstr.

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N84-27598 Missouri Univ., Columbia.
A RELATIONAL DATABASE SYSTEM FOR MICROCOMPUTERS: ANALYSIS, DESIGN, IMPLEMENTATION AND PERFORMANCE EVALUATION Ph.D. Thesis
Seyed Mohammad Reza Hashemi-Nassab 1983 419 p
Avail: Univ. Microfilms Order No. DA8406201

A relational database system for microcomputers was analyzed,

designed, implemented and evaluated. To meet this purpose the creation of a relational database interface language and a relational database management system was necessary. A relational database interface language (RDIL) was analyzed and designed. The RDIL language is a context free language and works based on relational algebra. This language is constructed of two sublanguages: a data definition language (DDL) and a data manipulation language (DML). The DDL is used for defining the database identifications, domains, relations, and security. The DML is used for manipulation of the domains and relations. A prototype was made for RDIL as RDIL/I, which is a conversational language and is written in the Cromemco BASIC language. The analysis and design of a relational database management system (RDBMS) were undertaken. A prototype was also made for RDBMS named MICREL. Dissert. Abstr.

N84-27599 Cornell Univ., Ithaca, N.Y.
MANAGING DISTRIBUTED DATABASES IN PARTITIONED NETWORKS Ph.D. Thesis
David Dixon Wright 1984 113 p
Avail: Univ. Microfilms Order No. DA8407344

A distributed database (DDB) is subject to network partitioning; that is, failures may leave sites disconnected. If a DDB with replicated data becomes partioned, its sites must either suspend activity until the failure is repaired or modify their activities to maintain serializability. Adaptations are either conservative, and guarantee that all activity will be serializable, or optimistic, and require some transactions to be backed out to establish serializability when the failure is repaired. Conservative strategies are considered to be composed of class assignment rules, which allocate transaction classes to partitions, conflict resolution rules, which ensure that the assignments are serializable, and version assignment rules, which specify the versions of data-items that are ready by specific transactions. Optimistic strategies do not restrict the transactions that are run during partitioning, but require that transactions be backed out when partitions are reconnected. A probabilistic model for predicting the level of conflict is presented and then modified to encompass extensions such as partial database replication. Dissert. Abstr.

N84-27600# Office of Naval Research, San Francisco, Calif.
JAPANESE RESEARCH INSTITUTES FUNDED BY PRIVATE CORPORATIONS
Y. B. Kim and S. Sakiyama Dec. 1983 18 p
(AD-A140892; ONRFE-M6) Avail: NTIS HC A02/MF A01 CSCL 05/2

A major difficulty faced by visitors to Japan, and those trying to contact Japanese scientists, is the lack of a comprehensive listing of investigators and laboratories. An attempt to satisfy this need was begun earlier with two predecessor volumes, Japanese Research Institutes Funded by the Ministry of Education, and Japanese Research Institutes Funded by Ministries Other Than Education, compiled by Seikoh Sakiyama, which were published as ONR Tokyo Scientific Monographs M2 and M4 (a similar listing of research institutes funded by the Ministry of Education was also published by the Japanese Society for the Promotion of Science). Copies of those volumes, ONRT M2 and ONRT M4, are still available from this office. The present volume completes the series and lists research institutes funded by private corporations. In this volume, the name, address, telephone number, specialty field, and the size and scope of activity of 100 research laboratories as well as the parent companies are given. The statistical information on each research laboratory and its parent company is followed by a narrative description of the laboratory's R&D activities. GRA

N84-27601# Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
TYPESETTING AND TROFF
J. N. Akkerhuis Dec. 1983 29 p refs
(MC-IW-247/83; B8465126) Avail: NTIS HC A03/MF A01

The history of typesetting is summarized. The UNIX (trademark) typesetting tools are described. Author (ESA)

N84-27175*# SRI International Corp., Menlo Park, Calif.
MST RADAR DATA-BASE MANAGEMENT
V. B. Wickwar *In* International Council of Scientific Unions Middle Atmosphere Program, Vol. 9 Dec. 1983 p 573-576 refs (For primary document see N84-27076 17-42)
Avail: NTIS HC A99/MF A01 CSCL 05B

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N84-27602# Price Waterhouse and Co., Washington, D. C. Office of Government Services.
REPORT ON U.S. DOMESTIC AND INTERNATIONAL TELECOMMUNICATIONS AND INFORMATION MARKETS Final Report
Feb. 1984 204 p refs Sponsored by NTIA
(PB84-166362) Avail: NTIS HC A10/MF A01 CSCL 05C

Contents: the U.S. telecommunications equipment market, 1970-82; the data processing equipment market, 1970-82; U.S. licensing and regulation of exports and imports of telecommunications and information equipment; U.S. Government procurement policies for telecommunications and information equipment; market for U.S. firms in telecommunications services; U.S. information services industry, 1970-82; new telecommunications and information services currently available or under development; Identification of the market for remote sensing by satellites; selected users of and benefits from telecommunications and information services. GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N84-27603# Committee of Conference (U. S. Congress).
MAKING APPROPRIATIONS FOR THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, AND FOR SUNDRY INDEPENDENT AGENCIES, BOARDS, COMMISSIONS, CORPORATIONS, AND OFFICES FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1985, AND FOR OTHER PURPOSES
Washington GPO 1984 29 p Conf. report to accompany H. R. 5713 presented by the Comm. of Conf., 98th Congr., 2nd Sess., 26 Jun. 1984
(H-Rept-98-867; GPO-36-040) Avail: US Capitol, House Document Room

The report of the Committee of Conference on the Amendments of the Senate to bill H.R. 5713 is presented. Appropriations for the fiscal year ending September 30, 1985 for the Department of Housing and Urban Development and sundry other agencies are discussed. Urban development, environmental protection, NASA programs, and the Veterans Administration are among the principal areas addressed. For individual titles, see N84-27604 through N84-27604.

N84-27604# Committee of Conference (U. S. Congress).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
In its Making Appropriations for the Dept. of Housing and Urban Develop., and for Sundry Independent Agencies, Boards, Comm., Corp., and Offices for the Fiscal Year Ending Sep. 30, 1985, and for Other Purposes 1984 p 19-21 (For primary document see N84-27603 17-84)
Avail: US Capitol, House Document Room

Federal appropriations for NASA programs and research projects for the fiscal year ending September 30, 1985 are enumerated and discussed in the context of the Committee of Conference report on H.R. 5713. Monies for orbital space stations, communication satellites, launch vehicles, space shuttle orbiters, space platforms, turboprop aircraft, and robotics are considered. R.S.F.

N84-27605# Committee of Conference (U. S. Congress).
AUTHORIZING APPROPRIATIONS FROM THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington GPO 1984 17 p Conf. rept. to accompany H. R. 5154 presented by the Comm. of Conf. at the 98th Congr., 2nd Sess., 27 Jun. 1984
(H-Rept-98-873; GPO-36-032) Avail: US Capitol, House Document Room

Points in disagreement between the House and Senate authorizations in response to NASA's request for $7,491,400,000 are examined and the committee of conference resolutions are explained. Adjustments to H.R. 5154 are summarized. The purpose and functions of the National Committee on Space are defined. A.R.H.

N84-27606# Institute for Foreign Policy Analysis, Inc., Cambridge, Mass.
TRANSATLANTIC POLICY DIVERGENCIES: IMPLICATIONS FOR THE UNITED STATES Final Technical Report
R. L. Pfaltzgraff, Jr. 13 Mar. 1984 538 p
(Contract MDA903-83-C-0051)
(AD-A140574) Avail: NTIS HC A23/MF A01 CSCL 05/4

Never in its troubled history has the Atlantic Alliance faced simultaneously such a large number of issues that divide its members and, in particular, separate the United States and some, if not all, of its allies in Western Europe. The purpose of this report is to identify issue categories that already divide, or are likely to be divisive, in the transatlantic relationship into the early years of the next decade for the following policy purposes: to take timely action to minimize such threats to Alliance cohesion; to indicate those issue areas in which the United States, if necessary, must be prepared to act unilaterally in support of interests that are not as fully shared by West European allies; and to develop an understanding of issues in which one or more members of the Atlantic Alliance share interests and threat perceptions that furnish the basis for collaborative action based on a coalition of the willing. Issues over which the Atlantic allies may divide can be delineated into essentially three categories: East-West political and technology transfer questions; NATO force structure, military modernization and arms control programs; and the out-of-area security problem confronting one or more Alliance members. GRA

N84-27607# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF DEPARTMENT OF DEFENSE FINANCIAL AND ACQUISITION POLICIES IN SUPPORT OF MILITARY CONTINGENCY REQUIREMENTS M.S. Thesis
J. S. Proctor and R. E. Sanders Mar. 1984 882 p
(AD-A140820) Avail: NTIS HC A99/MF A01 CSCL 05/1

The purpose of this study is to evaluate the viability of the financial and acquisition policies of DOD in support of Military Contingency Requirements. This study explores the historical perspectives, as well as the current contingency authorities, policies, and legislation. This same perspective is also applied in evaluating the salient features of industrial preparedness, economic and social impacts of government defense expenditures, war reserves, strategic stockpiles, and the complexities of funding these policies. This research indicates existing policies viably support the projected requirements of any military contingency short of a war. However, this viability is seriously challenged by: the age and relevance of many statutes; their lack of consolidation; the necessary diversion of funds from needed programs; the reliance upon supplemental appropriations, and the integrity of the defense industrial base. The researchers propose several wide-ranging programs to strengthen military capabilities and readiness. GRA

N84-27608# Deputy Chief of Staff for Research Development and Acquisition (Air Force), Washington, D.C.
JUSTIFICATION OF ESTIMATES FOR FISCAL YEAR 1985 SUBMITTED TO CONGRESS FEBRUARY 1984. OTHER PROCUREMENT, AIR FORCE
Feb. 1984 30 p
(AD-A140835) Avail: NTIS HC A03/MF A01 CSCL 15/5

This report includes Air Force budgetary justifications submitted to Congress for Fiscal Year 1985 for procurement and modification of equipment (including ground guidance and electronic control equipment, and ground electronic and communication equipment), and supplies, materials, and spare parts, not otherwise provided for; the purchase not to exceed two vehicles required for the physical security of overseas personnel notwithstanding price limitations applicable to passenger carrying vehicles but not to exceed $110,000 per vehicle and the purchase of not to exceed one thousand six hundred and twenty-eight passenger motor vehicles which one thousand three hundred and seventy-seven will be for replacement only and expansion of public and private plants, Government-owned equipment and installation in plants, erection of structures, and acquisition of land without regard to Section 9774 of Title 10, United States Code, for the foregoing purposes, and lands and interests may be acquired, and construction prosecuted prior to the approval of Title as required by Section 355, Revised Statutes, as amended: reserve plant and Government and contractor-owned equipment layaway $9,561,500 to remain available for obligation until September 30, 1987. GRA

N84-27609# Deputy Chief of Staff for Research Development and Acquisition (Air Force), Washington, D.C.
JUSTIFICATION OF ESTIMATES FOR FISCAL YEAR 1985 SUBMITTED TO CONGRESS FEBRUARY 1984. MISSILE PROCUREMENT, AIR FORCE
Feb. 1984 73 p
(AD-A140836) Avail: NTIS HC A04/MF A01 CSCL 15/5

This report includes Air Force budgetary justifications submitted to Congress for Fiscal Year 1985 for construction, procurement, and modification of missiles, spacecraft, rockets, and related equipment, including spare parts and accessories, ground handling equipment, and training devices; expansion of public and private plants, Government-owned equipment and installation in such plants, erection of structures, and acquisition of land for the foregoing purposes, and such lands and interests may be acquired and construction prosecuted prior to approval of title plant and Government and contractor-owned equipment layaway; and other expenses necessary for the above purposes including rents and transportation; a certain amount of which shall be available for the purchase of the Phase 3 Defense Satellite Communications System (DSCS 3) under a multiyear contract provided, that after the Secretary of the Air Force gives written notification of a proposed multiyear contract for the Defense Satellite Communications System to the Committees on Appropriations of the Senate and House of Representatives, such contract may not then be awarded until forty-five days after notification; and of which an allotment for cooperative NATO air base defense not be available to support implementing an agreement with any foreign government until forty-five days after agreement, together with supporting data including total program cost estimates, has been submitted to the Congress. GRA

N84-27610# Deputy Chief of Staff for Research Development and Acquisition (Air Force), Washington, D.C.
JUSTIFICATION OF ESTIMATES FOR FISCAL YEAR 1985 SUBMITTED TO CONGRESS FEBRUARY 1984. AIRCRAFT PROCUREMENT, AIR FORCE
Feb. 1984 230 p
(AD-A140837) Avail: NTIS HC A11/MF A01 CSCL 15/5

This report includes the Air Force budgetary justification submitted to Congress for Fiscal Year 1985 for construction, procurement, and modification of aircraft and equipment, including armor and armament, specialized ground handling and training devices, spare parts, and accessories; specialized equipment; expansion of public and private plants, Government-owned equipment, and installation in plants, erection of structures, and acquisition of land, and construction; for the foregoing purposes, and such lands and interests therein, may be acquired, and construction prosecuted thereon prior to the approval of title; and construction; reserve plant and Government and contractor-owned equipment layaway; and other expenses; including rents and

transportation of things; $28,676,500,000, to remain available for obligation until September 30, 1987. GRA

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

No abstracts in this category.

88 SPACE SCIENCES (GENERAL)

N84-27611# European Space Agency, Paris (France).
REPORT ON THE ACTIVITIES OF THE SPACE SCIENCE DEPARTMENT Annual Report, 1982-1983
D. E. Page, comp., B. Fitton, comp., A. Pedersen, comp., B. G. Taylor, comp., K.-P. Wenzel, comp., and W. R. Burke, ed. Feb. 1984 87 p refs Original contains color illustrations
(ESA-SP-1062; ISSN-039-6566) Avail: NTIS HC A05/MF A01; ESA, Paris FF 60 Member States, AU, CN and NO (+20% others)

The ESA research in cosmic rays, space plasma physics, astronomy, and high energy astrophysics is summarized. Cosmic ray studies included a low energy proton experiment on ISEE-3; the COSPIN experiment on ISPM; ultra heavy cosmic ray nuclear experiment; solar wind interaction with cometary environment; and solar luminosity. Active plasma experiments were performed and spacecraft-plasma interactions were investigated. Astronomy projects included IUE, the Space Telescope, and Hipparcos. In astrophysics, work continued on COS-B and EXOSAT.
Author (ESA)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N84-27612 Harvard Univ., Cambridge, Mass.
SEYFERT GALAXY NARROW-LINE REGIONS: A SPECTROSCOPIC INVESTIGATION Ph.D. Thesis
Jan Mojmir Vrtilek 1983 147 p
Avail: Univ. Microfilms Order No. DA8403057

Spectra of the [OIII] emission line at 500.7 nm from the nuclear regions of 32 Seyfert galaxies and low-redshift Quasi-Stellar Objects (QSOs) were obtained. A group of numerical measures for describing the line profiles was developed. The measures were tabulated for the data, and the distributions of line profile measures are shown. Using galaxian system velocities obtained from absorption-line measurements, the distribution of differences between [OIII] was determined. A model incorporating continuity-constrained radial flow of emitting material in a bounded, spherical geometry was developed. The comparison of model line profiles to data was used as a probe of the line-emitting region kinematics. The results indicate heterogeneous kinematic conditions; the most common pattern is outflow of emitting material in a radially decelerating velocity field in the presence of distributed obscuration. Dissert. Abstr.

N84-27613*# Texas Univ., Austin. Dept. of Astronomy.
ACCRETION DISKS, PRECESSING JETS AND THE ASYMMETRIC EMISSION LINES OF QSOS
G. A. Shields [1983] 14 p refs Submitted for publication Sponsored by NASA and NSF
(NASA-CR-173632; NAS 1.26:173632) Avail: NTIS HC A02/MF A01 CSCL 03A

The broad line profiles of active galaxies are consistent with emission from the surface of an accretion disk ionized by an ultraviolet continuum emitted from a linear or point source of continuum above the disk. If the point source is offset from the axis of the disk, then the line peak is shifted from zero velocity in a way that resembles observed cases. This misalignment could result from the Lense-Thirring precession of a rotating black hole.
Author

N84-27614*# Hawaii Univ., Honolulu. Inst. for Astronomy.
DETERMINATION OF THE IO HEAT FLOW. 1: ECLIPSE OBSERVATIONS
William M. Sinton and Charles Kaminski 14 Mar. 1983 33 p refs Revised
(Contract NASw-3159; Grant NGL-12-001-057)
(NASA-CR-173631; NAS 1.26:173631) Avail: NTIS HC A03/MF A01 CSCL 03A

The thermal emission from Io during eclipse by Jupiter yields data from which the total thermal flux from the volcanoes on the satellite surface can be estimated. Thermal infrared observations in spectral bands between 3.5 and 30 microns of five Io eclipse reappearances and one eclipse disappearance are reported and discussed. The thermal emission of the volcanoes which occurs almost all of the time was determined from the Io heat flux data. The thermal observations of Io are discussed with respect to previous thermophysical theories. R.S.F.

N84-27615*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
W3 NORTH: FAR-INFRARED AND RADIO MOLECULAR OBSERVATIONS
Harley A. Thronson, Jr. (Wyoming Univ., Laramie), P. R. Schwartz (NRL, Washington, D.C.), Howard A. Smith (NRL, Washington, D.C.), Charles J. Lada (Arizona Univ., Tucson), W. Glaccum (Chicago Univ., Ill.), and D. A. Harper (Chicago Univ., Ill.) May 1984 23 p refs
(NASA-TM-85961; A-9755; NAS 1.15:85961) Avail: NTIS HC A02/MF A01 CSCL 03A

The W3 North (G133.8 + 1.4) source is the northernmost member of a string of active star forming regions that marks the western boundary of the giant HII region W4. Far infrared and radio observations of molecular CO were made of the W3 star forming region. The W3 North object shows extended dust and gas emission which suggests a fairly advanced disruption of a molecular cloud. An estimate of the age of the embedded HII region is given, and emission maps of the W3 object are presented. The W3 North source may be the oldest object among the W3 complex of sources. R.S.F.

N84-27616*# National Aeronautics and Space Administration, Washington, D. C.
ABUNDANCES IN GALACTIC H2 REGIONS, 3: G25.4-0.2, G45.5+0.06, M8, S159 AND DR22
J. L. Pipher (Rochester Univ.), H. L. Helfner (Rochester Univ.), T. Herter (Grumman Aerospace Corp., Bethpage, N.Y.), D. A. Briotta, Jr. (Cornell Univ.), J. R. Houck (Cornell Univ.), S. P. Willner (Center for Astrophysics), and B. Jones (California Univ. at San Diego, La Jolla) Jun. 1984 34 p refs
(NASA-TM-85962; A-9756; NAS 1.15:85962; Preprint-017) Avail: NTIS HC A03/MF A01 CSCL 03A

Measurements of the ArII (6.99 microns), ArIII (8.99 microns), NeII (12.81 microns), SIII (18.71 microns), and SIV (10.51 microns) lines are presented for five compact HII regions along with continuum spectroscopy. From these data and radio data, lower limits to the elemental abundances of Ar, S, and Ne were deduced. The complex G25.4-0.2 is only 5.5 kpc from the galactic center,

and is considerably overabundant in all these elements. Complex G45.5+0.06 is at seven kpc from the galactic center, and appears to be approximately consistent with solar abundance. The complex S159 in the Perseus Arm, at 12 kpc from the galactic center, has solar abundance, while M8 in the solar neighborhood may be somewhat overabundant in Ar and Ne. Complex DR 22, at 10 kpc from the galactic center in the Cygnus Arm, is overabundant in Ar. A summary of results from a series of papers on abundances is given. R.S.F.

N84-27617*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
IRRADIANCE FROM STARS BASED ON BLACKBODY THEORY
William A. Jacobs Jun. 1984 19 p refs
(NASA-TM-82582; NAS 1.15:82582) Avail: NTIS HC A02/MF A01 CSCL 03A

A computer program which calculates a theoretical backbody curve for a star when given only the star's temperature and visual magnitude is presented. The program was written to produce approximate stellar spectra to be used in the design of the Space Telescope Fine Guidance System (FGS). In addition to the blackbody curve, the program calculates the number of photons tht would be received by the Space Telescope per 25 MSEC interval in wavelength increments of 0.2 microns. The equations used for the computations work best for stars that emit primarily in the range of near infrared to ultraviolet. R.S.F.

N84-27618 Missouri Univ., Columbia.
NEAR-INFRARED SURFACE PHOTOMETRY OF BARRED SPIRAL GALAXIES Ph.D. Thesis
Chris Warren Baumgart 1983 344 p
Avail: Univ. Microfilms Order No. DA8406171

Near-infrared photographic plates of eleven barred spiral galaxies were studied for the purpose of determining those parameters which characterize the luminosity and mass structures of the stellar bars of these systems. Although the galaxies under study are all SB forms, they show relatively few strong similarities in their radial luminosity profiles. All exhibit significant isophotal twisting in their central regions which suggests that the bulges (and in some cases, the bars) of these systems are triaxial in nature. About one-half possess radial luminosity profiles in which the disk component, if extrapolated into the central regions of the galaxy, would contribute more luminosity than is actually observed, suggesting that the disk contributes very little, if any, luminosity interior to the bar radius. The observed characteristics of the stellar bars of the subject galaxies in general do not correlate well with those characteristics predicted by a numerical model of a stellar bar. Several points of disagreement between the numerical model and the observations of real stellar bars indicate that such numerical models are still to simplified. Dissert. Abstr.

N84-27619 Harvard Univ., Cambridge, Mass.
DYNAMICAL STUDIES OF CLUSTERS OF GALAXIES Ph.D. Thesis
Timothy Carter Beers 1983 291 p
Avail: Univ. Microfilms Order No. DA8402978

The spatial and velocity distribution of galaxies in clusters were studied. Contour maps of galaxy surface number density were constructed for a sample of 65 optically selected clusters. A statistical criterion was developed for assessing the significance of substructure within the galaxy distribution. The optical and X-ray properties of the original X-ray double clusters, - A98, A115, A1750, and SC0627-54 were compared. The galaxy distributions in these clusters conform very close to the X-ray surface brightness maps. Dynamical studies are reported for A98 and A115. Three clusters selected on the basis of apparent substructure in their galaxy distributions - A754, A1142, and the Cancer cluster - were studied in detail. Dissert. Abstr.

N84-27646*# Center for Astrophysics, Cambridge, Mass. National Solar Observatory.
PHOTOMETRIC VARIATIONS OF SOLAR-TYPE STARS: RESULTS OF THE CLOUDCROFT SURVEY
Mark S. Giampapa *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 173-179 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03A

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N84-27620 Harvard Univ., Cambridge, Mass.
A HYBRID N-BODY/FOKKER-PLANCK STELLAR DYNAMICAL CODE WITH APPLICATION TO LATE CORE COLLAPSE IN GLOBULAR CLUSTERS Ph.D. Thesis
Stephen Lewin William McMillan 1983 128 p
Avail: Univ. Microfilms Order No. DA8403025

A stellar dynamic computer code, combining a three-dimensional direct N-body code with a two-dimensional integration of the Fokker-Planck equation in phase space was developed and tested and used to study the behavior of the central regions of an evolved stellar system, while still retaining the large-N framework appropriate to the study of the cluster as a whole. The method is applied to the problem of late core collapse in globular clusters, starting with a system already well into the homologous collapse phase, with around sixty stars in the core. At the end of the run, binary heating is again becoming significant and a second expansion phase appears imminent. It is conjectured that a series of core oscillations ensues, governed by the formation, hardening and ejection of tightly bound pairs. The connection between this oscillatory phase and the long-term post-collapse evolution of the system as a whole is discussed, and the effects of the inclusion of realistic stellar properties considered. Dissert. Abstr.

N84-27621 Maryland Univ., College Park.
SPATIAL FLUCTUATIONS IN THE DIFFUSE COSMIC X-RAY BACKGROUND, VOLUMES 1 AND 2 Ph.D. Thesis
Richard Arrick Shafer 1983 518 p refs
Avail: Univ. Microfilms Order No. DA8405703

Data from the A-2 experiment on HEAO 1 present the best opportunity to date to study anisotropies in the 2.5-13 keV band. The quality of the data encourages a critical assessment of the fluctuations analysis technique. An excellent fit to the data is given by model fluctuations distributions (P(D) curves) for a Euclidean N(S) with an additional, pure Gaussian, component (excess variance). The Euclidean component indicates a continuation of the resolved source counts at least a decade below the flux limit of the A-2 resolved source flux limit. Parametric models of AGN (quasar) luminosity function evolution are examined. They are most constrained by the total sky flux. The acceptability of particular models hinges on assumptions currently not directly testable. The comparison with the Einstein Observatory 1.3 keV low flux source counts is hampered by spectral uncertainties. A tentative measurement of a large scale dipole anisotropy is consistent with the velocity and direction derived from the dipole in the microwave background. The impact of the X-ray anisotropy limits for other scales on studies of large-scale structure in the universe is sketched. Models of the origins of the X-ray sky flux are reviewed, and future observational programs outlined. Dissert. Abstr.

N84-27622# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SEARCH FOR NEW WATER VAPOR MASERS IN THE DIRECTION OF ROW 19-20, 38 AND 48-49 M.S. Thesis - 26 Aug. 1983 [PROCURA DE NOVOS MASERS DE VAPOR DAGUA NA DIRECAO DE ROW 19-20, 38 E 48-49]
Jose Luiz Monteiro doVale Mar. 1984 85 p refs In PORTUGUESE; ENGLISH summary
(INPE-3039-TDL/156) Avail: NTIS HC A05/MF A01

The identification of regions of sequential massive star formation, using maser sources of H2O molecule as indicators is

discussed. The equations that govern the evolution of a shock front produced by the ionizing radiation of an OB star group are derived. The stability conditions in this shock front are then analyzed. The binomial H2O maser-massiver star is examined to clarify why regions of recent star formation are being identified using maser sources. From the three choosen regions, RCW 19-20, RCW 38 and RCW 48-49, only RCW 38 shows the necessary conditions for the above identification. Author

N84-27623*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE Z3 MODEL OF SATURNS MAGNETIC FIELD AND THE PIONEER 11 VECTOR HELIUM MAGNETOMETER OBSERVATIONS
J. E. P. Connerney, M. H. Acuna, and N. F. Ness May 1984 22 p refs
(NASA-TM-86118; NAS 1.15:86118) Avail: NTIS HC A02/MF A01 CSCL 03B

Magnetic field observations obtained by the Pioneer 11 vector helium magnetometer are compared with the Z(sub 3) model magnetic field. These Pioneer 11 observations, obtained at close-in radial distances, constitute an important and independent test of the Z(sub 3) zonal harmonic model, which was derived from Voyager 1 and Voyager 2 fluxgate magnetometer observations. Differences between the Pioneer 11 magnetometer and the Z(sub 3) model field are found to be small (approximately 1%) and quantitatively consistent with the expected instrumental accuracy. A detailed examination of these differences in spacecraft payload coordinates shows that they are uniquely associated with the instrument frame of reference and operation. A much improved fit to the Pioneer 11 observations is obtained by rotation of the instrument coordinate system about the spacecraft spin axis by 1.4 degree. With this adjustment, possibly associated with an instrumental phase lag or roll attitude error, the Pioneer 11 vector helium magnetometer observations are fully consistent with the Voyager Z(sub 3) model. Author

N84-27624 Princeton Univ., N. J.
NONLINEAR GROWTH OF PERTURBATIONS IN AN EINSTEIN-DE SITTER COSMOLOGY Ph.D. Thesis
Edmund William Bertschinger 1984 237 p
Avail: Univ. Microfilms Order No. DA8405865

Analytic and semianalytic solutions for the nonlinear growth of perturbations in an Einstein-de Sitter universe are presented. Similarity solutions for the evolution of voids or holes are given. A negative density (or positive energy) perturbation grows until it becomes a hole, surrounded generally by a thin, dense shell. The shell and hole expand in a self-similar fashion. Similarity solutions for secondary infall and accretion are presented. A positive density perturbation decelerates faster than its surroundings and eventually turns around to recollapse. Since more distant mass shells are bound, they also turn around, at successively later times, for more distant shells. Solutions are given for collisionless, collisional, and mixed fluids. Dissert. Abstr.

N84-27625 California Univ., Santa Cruz.
HIGH RESOLUTION SURFACE PHOTOMETRY OF ELLIPTICAL GALAXIES Ph.D. Thesis
Tod Richard Lauer 1983 269 p
Avail: Univ. Microfilms Order No. DA8406988

High-resolution surface photometry profiles were obtained for 42 nearby elliptical and SO galaxies to investigate their central structure and core properties. A hybrid Fourier doconvolution procedure was developed in order to correct the face photometry for seeing in a model-independent way. Isophote shapes, faint stellar disks, and dust lanes were found to occur in some galaxies. Core radii and central surface brightnesses were measured from the seeing-deconvolved photometry, which in turn yield central mass-to-light ratios. The present results support the formation of elliptical galaxies from proto-galactic gas clouds rather than as the end products of a dissipationless merger hierarchy of less massive stellar systems. Dissert. Abstr.

N84-26920# Joint Publications Research Service, Arlington, Va.
FLOW OF STELLAR WIND PAST X-RADIATION SOURCE Abstract Only
K. V. Krasnobayev and R. A. Syunyayev *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) 13 Apr. 1984 p 26 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekh. Zhidk. i Gaza (Moscow), no. 4, Apr. 1983 p 106-111 (For primary document see N84-26895 17-31)
Avail: NTIS HC A04/MF A01

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N84-27626 Wisconsin Univ., Madison.
THE 10 PLASMA TORUS: ITS STRUCTURE AND SULFUR EMISSION SPECTRA Ph.D. Thesis
Ronald James Oliversen 1983 247 p refs
Avail: Univ. Microfilms Order No. DA8400505

Fabry-Perot/CCD images and emission line spectra obtained from observations of (S2) lambda lambda 6716,6731 and (S3) lambda 9531 emissions from the Io plasma torus revealed the (S2) emission to peak closer to Jupiter than the (S3) emission. The former emission varied more in peak intensity and radial extent than the latter. When the (S2) emission and the (S3) emission overlapped in the warm torus they had similar distributions. The discernible outer edge of the (S2) torus varied from Io's orbit to as far out as the maximum detectable (S3) emission. Neither emission peak intensity or radial extent showed a correlation with magnetic longitude. The centrifugal scale heights in the warm torus were approximately constant as a function of radial distance from Jupiter. Assuming a thermal energy distribution and an effective ion mass of 32 amu, the scale heights implied ion temperatures up to approximately five-hundred thousand K for the S(+) and S(++) ions in the warm torus. Line profile measurements of (S2) lambda 6731 and (S3) lambda 9531 made with a Doppler-compensated Fabry-Perot scanning spectrometer are analyzed. Dissert. Abstr.

N84-27627 New Mexico State Univ., Las Cruces.
TEMPORAL ALBEDO VARIATIONS IN SATURN'S ATMOSPHERE Ph.D. Thesis
Robert Michael Suggs 1983 223 p refs
Avail: Univ. Microfilms Order No. DA8407261

Temporal variations in the reflectivity of Saturn's atmosphere were investigated through the analysis of photographic images of Saturn. Data obtained eight years apart but with similar illumination and viewing geometries were, correlated with seasonal heating calculations. The south temperate regions show a brightening in blue light during the spring while the South Equatorial Belt remains more constant in reflectivity. Voyager images show that the Southern Hemisphere, when entering its autumn, is considerably brighter than the Northern Hemisphere. Because of the eccentricity of Saturn's orbit, the Southern Hemisphere undergoes rapid heating just after its vernal equinox while the Northern Hemisphere is subjected to much more constant illumination during its warm season. The brightening of the south temperate regions is hypothesized to be a seasonal process involving a reduction in the amount of ultraviolet absorbing aerosol present. The constancy of the deeper clouds of the South Equatorial Belt is consistent with a longer thermal time constant and lower amplitude of thermal response. The Equatorial Zone has shown some rapid variations in its reflectivity, possibly due to dynamic effects, while the very high aerosols of the polar regions may be influenced by magnetospheric interactions. Dissert. Abstr.

N84-27628 Cornell Univ., Ithaca, N.Y.
A PHYSICAL AND CHEMICAL STUDY OF TITAN: ATMOSPHERE, CLOUDS, AND HAZES Ph.D. Thesis
William Reid Thompson 1984 272 p refs
Avail: Univ. Microfilms Order No. DA8407437

Chemical synthesis in the atmosphere of the Saturn satellite Titan is initiated by solar ultraviolet radiation and by energetic charged particles (primarily Saturn magnetospheric electrons. This synthesis process is currently incorporating atmospheric CH4 and N2 into organic products at a rate which would produce tens of meters of nitrogenous organics and hundreds of meters to kms of hydrocarbons over 4.5 x 10 to the 9th power yrs. The hazes and upper clouds of Titan are composed of organic solids precipitating from above and of locally condensed gases produced primarily at higher altitudes. Organics such as benzonitrile, naphthalene, pentanenitrile, and xylenes can condense to produce visible hazes and clouds at the observed altitudes. Far infrared and microwave data were used to assess Titan cloud composition and optical depth. Multiple light scattering calculations indicate that Titan tholin (UV dark solids) overlying a bright condensate cloud is sufficient to explain the UV-visible spectrum of Titan shortward of 0.6 microns. Dissert. Abstr.

N84-27629 Indiana Univ., Bloomington.
THE EFFECT OF RADIATION PRESSURE IN NOVA EJECTA Ph.D. Thesis
James Walter Younger 1983 133 p
Avail: Univ. Microfilms Order No. DA8406855

Novae are eruptive stars that brighten by a factor of approximately 100,000 over a period of several days and then decline to their prenova brightness within a few years. Spectroscopic observations indicate that, during the outburst, gaseous material is being ejected from a stellar remnant at hundreds of kilometers per second. The ejected material then appears to suffer an additional acceleration after its initial ejection. One possible origin of the accelerations is the absorption of portions of the photospheric continuum radiation by the ejecta - particularly in the ultraviolet. A computer code was written which couples the transfer of spectral line radiation with the ionization and excitation equilibrium for a four-level hydrogen atom with continuum. The accelerations resulting from the absorption of the stellar remnant radiation are then included in the equation of motion throughout the envelope. Based on models generated by this computer code, positive velocity gradients do exist in the ejecta of some novae and radiative accelerations appear to play a relatively insignificant role in the evolution of the ejecta of novae. Dissert. Abstr.

N84-27630*# Mackinnon Consulting Services, Houston, Tex.
AEM OF EXTRATERRESTRIAL MATERIALS Final Report
Ian D. R. Mackinnon Sep. 1982 28 p refs
(Contract NAS9-16491)
(NASA-CR-167781; NAS 1.26:167781) Avail: NTIS HC A03/MF A01 CSCL 03B

Modifications to and maintenance of the JEOL 100 CX electron microscope are discussed. Research activity involving extraterrestrial matter, cosmic dust, stratosphere dust, and meteorites is summarized. R.S.F.

N84-27631*# Hawaii Univ., Honolulu. Inst. for Astronomy.
ON IO, ALL THAT FLICKERS IS NOT COLD
William M. Sinton [1983] 34 p refs
(Grant NGL-12-001-057)
(NASA-CR-173447; NAS 1.26:173447) Avail: NTIS HC A03/MF A01 CSCL 03B

The 4.8 micron flux from the Galilean satellite Io was shown to fluctuate with an amplitude of approximately 10 percent on time scales of every 28 seconds, 40 minutes, night-to-night, and perhaps year-to-year. Such behavior was found to be the result of random fluctuations for which the mean square fluctuation varies inversely with frequency for constant bandwidth measurement. The theory developed for thermionic emission from barium oxide cathodes in vacuum tubes might be applicable to this situation. If so, the fluctuations in the flux from Io's volcanoes may be caused by diffusion of hot convective cells onto the surface of Io. Long term fluctuations may furnish a means by which the Io volcanism can shut down and conserve energy. Thus the discrepancy that exists between measurements of the current heat flow from Io and calculations of tidal dissipation may be resolved. Tests for rapid flickering at 10 microns showed no fluctuations greater than one percent. This agrees with the prediction of the flow model theory in which the 10 microns volcanic thermal emission arises from cooling of old flows. R.S.F.

N84-27632*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERACTION OF THE PLASMA TAIL OF COMET BRADFIELD 1979L ON 1980 FEBRUARY 6 WITH A POSSIBLY FLARE-GENERATED SOLAR-WIND DISTURBANCE
Malcolm B. Niedner, Jr., John C. Brandt, R. D. Zwickl (Los Alamos Scientific Lab.), and S. J. Bame (Los Alamos Scientific Lab.) [1983] 7 p refs Presented at the Solar Wind 5 proceedings
(Contract W-7405-eng-36)
(NASA-TM-85617; NAS 1.15:85617; DE83-011332; LA-UR-83-1023; CONF-821159-6) Avail: NTIS HC A02/MF A01 CSCL 03B

Solar-wind plasma data from the ISEE-3 and Helios 2 spacecraft were examined in order to explain a uniquely rapid 10 deg turning of the plasma tail of comet Bradfield 1979l on 1980 February 6. An earlier study conducted before the availability of in situ solar-wind data (Brandt et al., 1980) suggested that the tail position angle change occurred in response to a solar-wind velocity shear across the polar component changed by approximately 50 km/s. The present contribution confirms this result and further suggests that the comet-tail activity was caused by non-corotating, disturbed plasma flows probably associated with an importance 1B solar flare. M.G.

N84-27633# Technische Univ., Graz (Austria). Inst. fuer Weltraumforschung.
THE MAGNETIC FIELD EXPERIMENT FOR THE VENUS-HALLEY (VEGA) MISSION
W. K. Riedler, K. Schwingenschuh, R. Schmidt, Ye. G. Yeroshenko (Academy of Sciences, Troitsk, USSR), and V. A. Stjazhkin (Academy of Sciences, Troitsk, USSR) 1983 11 p refs Sponsored by Oesterreichische Akademie der Wissenschaften
(IWF-8301) Avail: NTIS HC A02/MF A01

The Magnetic Fields in Interplanetary Space during Comet Halley's Approach experiment (MISCHA) on board the Venus-Halley probes is presented. The probes will be launched in December 1984, the Venus fly-by is planned for June 1985 and the Halley encounter for March 1986. Each of the two spacecraft carries one fluxgate magnetometer with two sensors. The magnetometer unit can perform a spectral analysis of the magnetic field fluctuations to obtain better information on the higher frequency components. Objectives include investigation of the magnetic field in the cometary environment, study of the macroscale structure of the interplanetary magnetic field and measurement of low frequency fluctuations along the spacecraft trajectory. Author (ESA)

N84-27634 Arizona State Univ., Tempe.
10: MODELS OF VOLCANISM AND INTERIOR STRUCTURE Ph.D. Thesis
Larry Steven Crumpler 1983 162 p
Avail: Univ. Microfilms Order No. DA8405493

The silicate magma trigger model of volcanism on Io is evaluated numerically with finite element methods by considering the one dimensional heat transfer between hot silicate magma and initially cold sulfur. For the probable range of initial magma temperatures and sulfur temperatures, the contact between silicate magma and a sulfur crust will be 700 + or - 100 K, or approximately the vapor point of elemental sulfur. This model may account for the origin of plumes and possible sulfur flows, as well as for their observed temperatures and lifetimes. Most of the heat flow from Io may be moved by convection from the interior to the surface, not by conduction. High alkalies in the Io plasma torus suggest

the possibility that the Ionian crust is a highly differentiated silicate. Dissert. Abstr.

N84-26823# Joint Publications Research Service, Arlington, Va.
STRUCTURAL FUNCTION OF LUNAR RELIEF ACCORDING TO RADAR DATA Abstract Only
I. M. Fuks *In its* USSR Rept.: Electron. and Elec. Eng. (JPRS-UEE-84-007) 29 May 1984 p 2 Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved.: Radiofiz. (Gorkiy), v. 26, no. 10, Oct. 1983 p 1194-1204 (For primary document see N84-26821 17-31)
Avail: NTIS HC A04/MF A01

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N84-27635*# National Aeronautics and Space Administration, Washington, D. C.
SOLAR IRRADIANCE VARIATIONS ON ACTIVE REGION TIME SCALES
Barry J. LaBonte, ed. (Hawaii Univ. at Manoa, Honolulu), Gary A. Chapman, ed. (California State Univ., Northridge), Hugh S. Hudson, ed. (California Univ. at San Diego, La Jolla), and Richard C. Willson, ed. (JPL) Washington May 1984 310 p refs Proc. of workshop held in Pasadena, Calif., 20-21 Jun. 1983
(NASA-CP-2310; NAS 1.55:2310) Avail: NTIS HC A14/MF A01 CSCL 03B

The variations of the total solar irradiance is an important tool for studying the Sun, thanks to the development of very precise sensors such as the ACRIM instrument on board the Solar Maximum Mission. The largest variations of the total irradiance occur on time scales of a few days are caused by solar active regions, especially sunspots. Efforts were made to describe the active region effects on total and spectral irradiance. For individual titles, see N84-27636 through N84-27651.

N84-27636*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SOLAR TOTAL IRRADIANCE VARIABILITY MEASUREMENTS BY THE SMM/ACRIM I EXPERIMENT
Richard C. Willson *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 1-42 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Convincing evidence of solar total irradiance variability and its relationships with solar activity was provided by the Active Cavity Radiometer Irradiance Monitor I (ACRIM I) experiment on the NASA Solar Maximum Mission (SMM). SMM/ACRIM I, the first flight experiment dedicated to the task of solar irradiance monitoring, has produced a multiyear solar total irradiance data base with + or - 0.02% or better long term precision since its launch in February, 1980. While the climatological significance of the results will not be apparent until many more years of continuous data are acquired, the discovery of variability on solar active region time scales has provided new insight into the physics of solar activity in the early years of the mission. Author

N84-27637*# Eppley Lab., Inc., Newport, R.I.
STATUS OF SOLAR MEASUREMENTS AND DATA REDUCTION FOR ERB-NIMBUS 7
J. R. Hickey and B. M. Alton *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 43-58 refs (For primary document see N84-27635 17-92)
(Contracts NAS5-22947; NA81RA-C-00077)
Avail: NTIS HC A14/MF A01 CSCL 03B

The status of the Total Solar Irradiance data obtained using the cavity radiometer aboard the Earth Radiation Budget experiment of the Nimbus 7 satellite is described. The ERB experiment has a number of sensors which measure the radiative fluxes (both shortwave and infrared) leaving the Earth as well as the solar channels. The complexity of the processing of the Earth-flux data, both wide and narrow angle has necessitated a reprocessing effort which produces the final data. Since the solar data is embedded in the same data stream and tape product as the Earth-flux data, it was not generally available in a format convenient for analysis as a separate product. Values for the final data product only are presented and a few remarks concerning the basic features of the data. There is no scientific conclusions presented here other than those directly related to the measurement results. A set of tabulated values is appended. Author

N84-27638*# Tokyo Astronomical Observatory (Japan).
FACULAR LIMB-DARKENING FUNCTIONS FOR IRRADIANCE MODELING
T. Hirayama, T. Okamoto, and H. S. Hudson *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 59-72 refs Sponsored in part by US-Japan Cooperative Science Program (For primary document see N84-27635 17-92)
(Grant NSF ATM-81-17355)
Avail: NTIS HC A14/MF A01 CSCL 03B

The limb darkening function of faculae is an important factor in estimating facular contributions to solar irradiance variations. The existing photometric data is reviewed and a synthetic limb darkening function for faculae was generated which was compared with the limb darkening functions currently in use for irradiance modeling. The excess facular flux ranges from 0.017 to 0.0349 of the solar photospheric flux for the various representations. The present limitation appears to be the lack of comprehensive photometric data. The representations are especially varied near the limb, where photometry is most difficult. Synoptic data on calcium plage areas is used as a substitute for facular areas in modeling. Based upon the existing data, the present best value for the effect of faculae on the solar constant is given by delta s/s = 3.9 x 10(-8) A (sub plage prime) for an active region near disk center, where A (sub plage) is the calcium plage area in millionths of a solar hemisphere. Author

N84-27639*# California State Univ., Northridge.
GROUND-BASED MEASUREMENTS OF SOLAR IRRADIANCE VARIATIONS
Gary A. Chapman *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 73-89 refs Prepared in cooperation with San Fernando Observatory, El Segundo, Calif. (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Observations and analysis programs being carried out at the San Fernando Observatory are reviewed. A digital analysis of sunspot areas from full disk photographs shows an especially good correlation with areas published in the Solar Geophysical Data Bulletin with scale factor near unity. Results are presented from photoelectric photometry of active regions using the Extreme Limb Photometer. These results suggest energy balance between sunspots and faculae. Preliminary results are presented from a new program of photoelectric photometry using a linear array of diodes. Results are presented for the August 1982 passage of a large active region. This active region caused a maximum dip in the quiet Sun irradiance of about 800 parts per million. Author

N84-27640*# California State Univ., Northridge. Dept. of Physics and Astronomy.
TWO-DIMENSIONAL PHOTOMETRY OF ACTIVE REGIONS
John K. Lawrence, Gary A. Chapman, A. D. Herzog, and J. C. Shelton (TRW, Inc., Redondo Beach, Calif.) *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 91-96 refs Prepared in cooperation with San Fernando Observatory, El Segundo, Calif. (For primary document see N84-27635 17-92)
(Grant NSF AST-81-21863)
Avail: NTIS HC A14/MF A01 CSCL 03B

A set of two dimensional photometric images of solar active regions (AR's) are described. Preliminary analysis of the data is described, and estimates are presented of the contribution of an AR to total solar irradiance variations during its 1982 August 3 to 16 disk passage. Results indicate an excess contribution near the

limb and a deficit away from the limb. Also apparent is an evolutionary change in the AR which is represented as a decrease in sunspot area. Author

N84-27641*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
PHOTOMETRIC STUDIES OF HEAT FLOW AT THE PHOTOSPHERE
Peter Foukal *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 97-119 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Continuum photometry is carried out and the results of comparing these observations with models of photospheric heat flow are described. The main results are: (1) a possible detection of weak bright rings around some spot penumbrae; (2) no evidence is found for large scale photospheric brightness inhomogeneities exceeding 2-3 K which places tighter constraints on models of global scale convection; (3) supergranular scale continuum structures observed across the photosphere appear mainly due to random clumping of granules; (4) the one case observed of a sunspot emergence shows no thermal shadow exceeding 1.5 K rms one day prior to umbra appearance; (5) network and faculae are found to show a small excess brightness even at mu = 1, so detection of faculae at mu = 1 by differential photometry indicates a gentler temperature gradient near tau = 1 in the facular (relative to cell) atmosphere; (6) the limb darkening study shows no significant global variations to within 0.1% rms. M.A.C.

N84-27642*# High Altitude Observatory, Boulder, Colo.
INTERACTION OF CONVECTION AND SMALL-SCALE MAGNETIC FIELDS: INFLUENCE ON THE SOLAR LUMINOSITY
Ake Nordlund (Copenhagen Univ., Denmark) *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 121-123 refs Sponsored in part by NSF, Danish Space Board, and Danish Natural Science Research Council (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Changes in the local solar luminosity due to the presence of a small scale structured (facular) magnetic field in the photosphere are discussed. The discussion is based on three dimensional numerical simulations of the magnetohydrodynamics of the top of the convection zone, and the adjacent stable photosphere. The simulations demonstrate that practically all of the magnetic flux present is concentrated into intense magnetic flux structures, such that the magnetic field pressure is balanced by the gas pressure of the surrounding plasma. The flux concentration is caused by the convectively unstable stratification. The average luminosity of the area is influenced by three effects: (1) the brightness of the flux concentrations, (2) their filling factor, and (3) the average luminosity of the surrounding plasma. M.A.C.

N84-27643*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ENERGY FLOW CONTINUITY IN SOLAR ACTIVE REGIONS
K. H. Schatten *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 125-131 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

The models for sunspots are combined into an active region model with consideration for the energy flow beneath active regions. An apparent average energy balance exists between the sunspot deficit and the facular excess, i.e., no 11 year variations in solar luminosity associated with the activity centers. This is seen as a consequence of the upper convection zone's inability to store these significant amounts of energy for periods greatly in excess of weeks. This view is supported by observed active region behavior and detailed numerical modelling. Increases in facular and spot brightness are nearly commensurate, with the faculae outlasting the spots on time scales of the order of weeks to a couple of months. Foukal finds the radiation (deficit from a sunspot blocking model) recovers slowly on a timescale of approximately 83 days. M.A.C.

N84-27644*# Hawaii Univ., Honolulu. Inst. for Astronomy.
RECENT GROUND-BASED OBSERVATIONS OF THE GLOBAL PROPERTIES OF THE SUN
Barry J. LaBonte *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 151-163 refs (For primary document see N84-27635 17-92)
(Grant NGL-12-001-011)
Avail: NTIS HC A14/MF A01 CSCL 03B

Ground based observations have achieved sufficient sensitivity and duration to scrutinize many global properties of the Sun. Variations in the properties of granular and supergranular convection are measured. The surface rotation measurements continue to present contradictory results. A spectrum of torsional motions are detected. A variety of oscillation measurements now are available for nearly direct probing of the solar interior. M.A.C.

N84-27645*# Mount Wilson Observatory, Pasadena, Calif.
LIMB DARKENING VARIATIONS
David H. Bruning *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 165-172 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Variations of the solar limb darkening as measured in the line wing of the Fe I line at wavelength 5,250 are observed. The measurements are made over the visible solar disk excluding those points where the magnetic field strength exceeded five Gauss. This exclusion of magnetic points should reduce the effects of faculae upon the derived limb darkening curve. The observations cover 160 days and show evidence of variations of 0.002 I(0) over timescales of thirty days. M.A.C.

N84-27646*# Center for Astrophysics, Cambridge, Mass. National Solar Observatory.
PHOTOMETRIC VARIATIONS OF SOLAR-TYPE STARS: RESULTS OF THE CLOUDCROFT SURVEY c89
Mark S. Giampapa *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 173-179 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03A

The results of a synoptic program to search for the occurrence of photometric variability in solar type stars as seen in continuum band photometry are summarized. The survey disclosed the existence of photometric variability in solar type stars that is related to the presence of spots on the stellar surface. The observed variability detected in solar type stars is at enhanced levels compared to that observed for the Sun. M.A.C.

N84-27647*# High Altitude Observatory, Boulder, Colo.
THE K2-DWARF V471 TAU: A STELLAR VERSION OF SOLAR VARIABILITY
Andrew Skumanich (Kitt Peak National Observatory, Tucson, Ariz.) and A. Young (San Diego State Univ., Calif.) *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 185-196 refs Sponsored in part by NSF (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Simultaneous observations of the rotational modulation with a 1/2 day period of chromospheric H alpha emission and of broadband irradiance for the K2-dwarf in V471 Tau are presented. The observations cover eight rotation periods but do not cover the full surface of the dwarf because of timing constraints. Preliminary results show a phase relation between enhanced chromospheric emission and continuum darkening similar to that observed on the Sun. A comparison with chromospheric Mg II resonance emission modulation observed about 2 1/4 years earlier by Guinan and Sion shows that the same active longitude is involved. This is either coincidental due to lucky phasing or it signifies a stable longitude that has persisted for hundreds of rotations. Author

N84-27648*# Kitt Peak National Observatory, Tucson, Ariz.
HELIUM 10830 ANGSTROM IRRADIANCE: 1975-1983
John W. Harvey *In* NASA, Washington Solar Irradiance Variations

on Active Region Time Scales May 1984 p 197-211 refs Sponsored in part by NSF (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

A fairly complete time series from late 1974 to mid-1983 is available of values of the equivalent width of the He I 10830A chromospheric spectrum line averaged over the visible solar disk. Variation from about 25 mA in 1975 to about 80 mA in late 1981 is the major component of the signal. The 10830 variation reaches minimum about a year before the sunspot minimum and reaches maximum about a year after sunspot maximum. Superposed on the solar cycle variation is a modulation of up to + or - 13 mAdu to the passage of active regions across the disk. Power spectral analysis of the time series shows a major peak at a synodic rotation period of 27.42 days and smaller peaks at 1/2, 1/4 and 1/6 of this period. The spectrum is well modeled by a basic fluctuating component with an exponentially decaying autocovariance function of scale time of 43 days. Analysis of the data indicates that the rotational modulation occurs in episodes that last from 4 to 10 rotations. These episodes arise when active regions tend to occur in a limited longitude range. The analysis also shows that the apparent rotation period increased from 1977 to 1981. The apparent rotation period since 1981 is markedly shorter. A.R.H.

N84-27649*# High Altitude Observatory, Boulder, Colo.
THE SOLAR CONSTANT, CLIMATE, AND SOME TESTS OF THE STORAGE HYPOTHESIS
John A. Eddy *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 213-232 refs Sponsored in part by NSF (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Activity related modulation of the solar constant can have practical consequences for climate only if storage is involved, as opposed to a detailed balance between sunspot blocking and facular reemission. Four empirical tests are considered that might distinguish between these opposing interpretations: monochromatic measurements of positive and negative flux; comparison of modelled and measured irradiance variations; the interpretation of secular trends in irradiance data; and the direct test of an anticipated signal in climate records of surface air temperature. The yet unanswered question of the role of faculae as possible reemitters of blocked radiation precludes a definitive answer, although other tests suggest their role to be minor, and that storage and an 11 year modulation is implicated. A crucial test is the behavior of the secular trend in irradiance in the declining years of the present activity cycle. Author

N84-27650*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TEMPORAL VARIATIONS OF SOLAR UV SPECTRAL IRRADIANCE CAUSED BY SOLAR ROTATION AND ACTIVE REGION EVOLUTION
Richard F. Donnelly (Air Resources Lab., Boulder, Colo.), Donald F. Heath, Judth L. Lean (Colorado Univ., Boulder), and Gary J. Rottman (Colorado Univ., Boulder) *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 233-252 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Variations in the solar 100 to 400 nm UV spectral irradiance caused by solar rotation and active region evolution, are discussed as a function of UV wavelength, CMD dependence, and in relation to the temporal variations in the total solar irradiance, 10.7 cm radio flux, sunspot number and Ca K plage data. Active region radiation at cm wavelengths includes a component proportional to the magnetic field. Active region evolution involves a more rapid growth, peak and decay of sunspots and their strong magnetic fields than the Ca K plages and their related UV enhancements. Major plages often last a rotation or more longer than the active region's sunspots. Large active regions, including those associated with major dips in the total solar irradiance, tend to produce the strongest peaks in 10.7 cm and sunspot numbers on their first rotation, while the Ca K plages and UV enhancements peak on the next rotation and decay more slowly on subsequent rotations. Differences in CMD dependencies cause temporal differences including the stronger presence of 13 day variations in the UV flux. Author

N84-27651*# Colorado Univ., Boulder. Cooperative Inst. for Research in Environmental Sciences.
MODELLING SOLAR SPECTRAL IRRADIANCE VARIATIONS AT ULTRAVIOLET WAVELENGTHS
Judith L. Lean, W. C. Livingston (Kitt Peak National Observatory, Tucson, Ariz.), O. R. White (Lazy FW Ranch, Mancos, Colo.), and Andrew Skumanich (High Altitude Observatory, Boulder, Colo.) *In* NASA, Washington Solar Irradiance Variations on Active Region Time Scales May 1984 p 253-288 refs (For primary document see N84-27635 17-92)
Avail: NTIS HC A14/MF A01 CSCL 03B

Solar UV irradiance variations with solar activity are examined using a three component model of the CaII K chromospheric emission. This model, developed from ground based observations of the location, area and relative intensity of CaII K plage, in conjunction with measurements throughout solar cycle 21 of the full disc CaII K emission, includes the contributions to the ultraviolet flux from both plage and active network emission. The model successfully replicates changes in the Lyman alpha flux related to the 27 day rotation of solar plage, outbreaks (or rounds) of activity over periods of a year or more, and the growth and accumulation of active regions over the eleven year solar activity cycles. Estimates of the magnitude of the solar cycle variability of the UV emission between 200 and 300 nm are presented but cannot currently be verified by available observations. A.R.H.

N84-27652*# California Univ., Berkeley.
THE ANALYSIS OF SOLAR MODELS: NEUTRINOS AND OSCILLATIONS
R. K. Ulrich, E. J. Rhodes, Jr., S. Tomczyk, P. J. Dumont, and W. M. Brunish Dec. 1983 15 p refs Submitted for publication (Grant NsG-7407)
(NASA-CR-173628; NAS 1.26:173628; Preprint-153) Avail: NTIS HC A02/MF A01 CSCL 03B

Tests of solar neutrino flux and solar oscillation frequencies were used to assess standard stellar structure theory. Standard and non-standard solar models are enumerated and discussed. The field of solar seismology, wherein the solar interior is studied from the measurement of solar oscillations, is introduced. R.S.F.

N84-27653# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
BOUNDARY CONDITIONS FOR THE PHENOMENA OF SOLAR BURSTS ESTABLISHED FROM THE STATISTICAL BEHAVIOR OF HARD X-RAY BANDS M.S. Thesis [CONDICOES DE CONTORNO PARA O FENOMENO DAS EXPLOSOES SOLARES ESTABELECIDAS A PARTIR DO COMPORTAMENTO ESTATISTICO NA FAIXA DE RAIOS X DUROS]
Emilia Correia Oct. 1983 133 p refs In PORTUGUESE; ENGLISH summary
(INPE-2906-TDL/147) Avail: NTIS HC A07/MF A01

The statistical studies of solar burst parameters at X-rays and microwaves, as well as an analysis of the limits caused by instrumental sensitivity and their effect on the form of the distributions and on the establishment of boundary conditions for solar flare phenomena are presented. The statistical behavior of events observed with high sensitivity at hard X-rays with the HXRBS experiment (SMM) was performed. Maxima were formed in the parameters distribution, which is related to intrinsic characteristics of the source-regions. This result seems to confirm early studies which indicated the influence of the sensitivity limits. Assuming the maxima of the distributions as real, it was possible to establish boundary conditions for the mechanisms of primary energy release. The principal condition establishes that solar bursts are interpreted as a superposition of primary explosions. The statistical analysis permitted the estimate of a value for the amount

of energy in a primary explosion, making use of adjustments of Poisson functions. Author

N84-27654*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THERMAL BIFURCATION IN THE UPPER SOLAR PHOTOSPHERE INFERRED FROM HETERODYNE SPECTROSCOPY OF OH ROTATIONAL LINES
Drake Deming, John J. Hillman, Theodor Kostiuk, Michael J. Mumma, and David M. Zipoy (Maryland Univ.) Jun. 1984 32 p refs Submitted for publication
(NASA-TM-86128; NAS 1.15:86128) Avail: NTIS HC A03/MF A01 CSCL 03B

Low noise high spectral resolution observations of two pure rotation transitions of OH from the solar photosphere were obtained. The observations were obtained using the technique of optically null-balanced infrared heterodyne spectroscopy, and consist of center-to-limb line profiles of a v=1 and a v=0 transition near 12 microns. These lines should be formed in local thermodynamic equilibrium (LTE), and are diagnostics of the thermal structure of the upper photosphere. The v=0 R22 (24.5)e line strengthens at the solar limb, in contradiction to the predictions of current one dimensional photospheric models. Data for this line support a two dimensional model in which horizontal thermal fluctuations of order + or - 800K occur in the region Tau (sub 5000) approximately .001 to .01. This thermal bifurcation may be maintained by the presence of magnetic flux tubes, and may be related to the solar limb extensions observed in the 30 to 200 micron region. B.G.

N84-27655*# Stanford Univ., Calif. Center for Space Science and Astrophysics.
DETECTION OF SOLAR GRAVITY MODE OSCILLATIONS
P. H. Scherrer 1 Nov. 1983 13 p
(Contract NAS5-24420; Grant NGR-05-020-559; Contract N00014-76-C-0207; Grant NSF ATM-77-20580)
(NASA-CR-173642; NAS 1.26:173642; AD-A140794; SU-CSSA-ASTRO-84-03) Avail: NTIS HC A02/MF A01 CSCL 03/2

An analysis of solar velocity data obtained at the Stanford Solar Observatory has shown the existence of solar global oscillations (Delache and Scherrer, Nature, in press). The oscillations are in the range of 45 to 105 microHz (160 to 370 minutes) and are interpreted as internal gravity modes of degree l=1 and l=2. Author (GRA)

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N84-27656*# Stanford Univ., Calif. Inst. for Plasma Research.
EMISSION MODEL OF GAMMA-RAY BURSTS
E. P. Liang Mar. 1983 15 p refs Presented at E+E Workshop, Greenbelt, Md., Jan. 1983
(Grant NGR-05-020-668; Contract W-7405-eng-48)
(NASA-CR-173629; NAS 1.26:173629; SU-SUIPR-954) Avail: NTIS HC A02/MF A01 CSCL 03B

The emission mechanisms of cosmic gamma-ray bursts are reviewed. In particular, the thermal synchrotron model is discussed as the most viable mechanism for the majority of the continuum emission. Within this framework various information about the source region can be extracted. The picture that emerges is that of a hot (kT = .2 - 1.0 sq mc), thin sheet of dense pair-dominated plasma emitting via cyclo-synchrotron radiation in a strong magnetic field (B approximately one-hundred billion to one trillion gauss). Speculations on the origin and structure of this sheet are attempted. The problem of high-energy photons above pair production threshold escaping from the source is also considered. Author

N84-27657*# Columbia Univ., New York. Astrophysical Lab.
A SEARCH FOR X-RAY POLARIZATION IN COSMIC X-RAY SOURCES
John P. Hughes, Knox S. Long, and Robert Novick Feb. 1983 14 p refs Submitted for publication
(Grant NAGw-18)
(NASA-CR-173635; NAS 1.26:173635) Avail: NTIS HC A02/MF A01 CSCL 03B

Fifteen strong X-ray sources were observed by the X-ray polarimeters on board the OSO-8 satellite from 1975 to 1978. The final results of this search for X-ray polarization in cosmic sources are presented in the form of upper limits for the ten sources which are discussed elsewhere. These limits in all cases are consistent with a thermal origin for the X-ray emission. Author

N84-27658*# Washington Univ., St. Louis, Mo. Dept. of Physics.
ELEMENTAL ADVANCES OF ULTRAHEAVY COSMIC RAYS
27 Jun. 1984 28 p refs Prepared in cooperation with Minnesota Univ., Minneapolis and California Inst. of Tech., Pasadena
(Contract NAS8-27976; Grants NGR-005-002-160; NGR-24-005-050; NGR-26-008-001)
(NASA-CR-173650; NAS 1.26:173650) Avail: NTIS HC A03/MF A01 CSCL 03B

The elemental composition of the cosmic-ray source is different from that which has been generally taken as the composition of the solar system. No general enrichment of products of either r-process or s-process nucleosynthesis accounts for the differences over the entire range of ultraheavy (Z > 30) elements; specific determination of nucleosynthetic contributions to the differences depends upon an understanding of the nature of any acceleration fractionation. Comparison between the cosmic-ray source abundances and the abundances of C1 and C2 chondritic meteorites suggests that differences between the cosmic-ray source and the standard (C1) solar system may not be due to acceleration fractionation of the cosmic rays, but rather to a fractionation of the C1 abundances with respect to the interstellar abundances. R.S.F.

N84-27659*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A RADIOMETRIC BODE'S LAW: PREDICTIONS FOR URANUS
M. D. Desch and M. L. Kaiser Mar. 1984 17 p refs
(NASA-TM-86074; NAS 1.15:86074) Avail: NTIS HC A02/MF A01 CSCL 03B

The magnetospheres of three planets, Earth, Jupiter, and Saturn, are known to be sources of intense, nonthermal radio bursts. The emissions from these sources undergo pronounced long term intensity fluctuations that are caused by the solar wind interaction with the magnetosphere of each planet. Determinations by spacecraft of the low frequency radio spectra and radiation beam geometry now permit a reliable assessment of the overall efficiency of the solar wind in stimulating these emissions. Earlier estimates of how magnetospheric radio output scales with the solar wind energy input must be revised greatly, with the result that, while the efficiency is much lower than previously thought, it is remarkably uniform from planet to planet. The formulation of a radiometric Bode's Law from which a planet's magnetic moment is estimated from its radio emission output is presented. Applying the radiometric scaling law to Uranus, the low-frequency radio power is likely to be measured by the Voyager 2 spacecraft as it approaches this planet. B.G.

99 GENERAL

No abstracts in this category.

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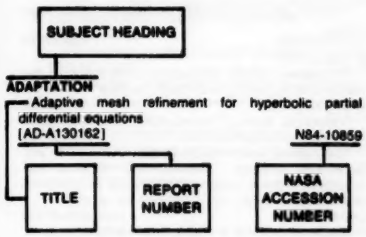

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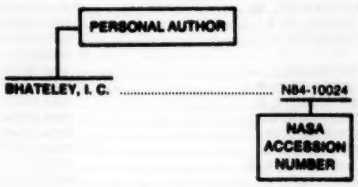

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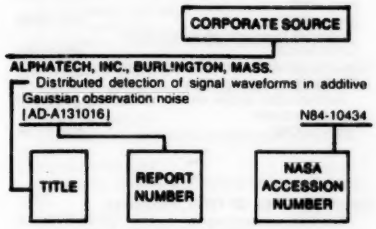

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INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, URBANA, ILL.
Middle Atmosphere Program. Handbook for MAP, volume 9
[NASA-CR-173439] N84-27076
IOWA DEPT. OF WATER, AIR AND WASTE MANAGEMENT, DES MOINES.
Air quality report, 1982
[PB84-166750] N84-27348
IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
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Windshield weight reduction through the use of high strength glass and polyurethane interlayers
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MEASUREMENTS GROUP, INC., RALEIGH, N.C.
Measurement of residual strains and stresses in transparent materials
[AD-P003209] N84-26622
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., BREMEN (WEST GERMANY).
Generation of marker lines by means of marker loads N84-27074
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., HAMBURG (WEST GERMANY).
Access to maintenance via Aircraft Integrated Data System (AIDS): Future aspects of the expanded AIDS N84-26567
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
Study on critical assessment of IR CCD arrays for spaceborne reflected and thermal IR imagers
[ESA-CR(P)-1881] N84-26744
Experimental exhaust plume investigation with MBB 10 N bipropellant thruster
[MBB-UR-558-84] N84-26747
MICHIGAN STATE UNIV., EAST LANSING.
Ill-posed problems in optimal control systems and a method to solve them N84-27487
MICHIGAN TECHNOLOGICAL UNIV., HOUGHTON.
Stochastic modeling of EDM with a view to off-line optimization
[PB84-162296] N84-26885
MICHIGAN UNIV., ANN ARBOR.
The simulation of deformable mechanical systems using vector processors N84-27045
MICRO-SURFACE FINISHING PRODUCTS, INC., WILTON, IOWA.
The reduction of life-cycle costs through continuing acrylic maintenance
[AD-P003224] N84-26637
MIDDLETON (DAVID), NEW YORK.
Multiple-element threshold signal detection of underwater acoustic signals in nongaussian interference environments
[AD-A140620] N84-27548
MINISTRY OF DEFENCE, LONDON (ENGLAND).
Artificial aging of transparent aerospace materials
[AD-P003210] N84-26623
MINISTRY OF TRANSPORT AND CIVIL AVIATION (ENGLAND).
Deficiencies of current flight data recorders in accidents investigation N84-26575
MINNESOTA UNIV., MINNEAPOLIS.
High temperature oxide electrolytes for the splitting of water--the ROC process
[AD-A140881] N84-26765
Studies of heat transfer in complex internal flows
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Studies of acoustical properties of bulk porous flexible materials
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[NASA-CR-173650] N84-27658
MISSOURI UNIV., COLUMBIA.
Contextual classification of remotely sensed data N84-27245
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A relational database system for microcomputers: Analysis, design, implementation and performance evaluation N84-27598
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Approximating the level probabilities in order restricted inference: The simple tree ordering
[AD-A140684] N84-27525
Neutron diffraction studies of some rare earth-transition metal deuterides
[AD-A140757] N84-27557
MITRE CORP., BEDFORD, MASS.
A study of the feasibility of duplicating JAMPS applications software in the Ada programming language
[AD-A140864] N84-27477
MITRE CORP., MCLEAN, VA.
Assessment of techniques for evaluating computer systems for Federal Agency procurements
[PB84-176494] N84-27496
MOUNT WILSON OBSERVATORY, PASADENA, CALIF.
Limb darkening variations N84-27645

N

NAGOYA UNIV. (JAPAN).
Introduction to the theory of fluid and magnetofluid turbulence
[IPPJ-670] N84-27565
NANCY UNIV. (FRANCE).
Low temperature structure and properties of graphite lamellar compounds
[AD-A140875] N84-27579
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Causes and effects of changes in stratospheric ozone: Update 1983
[PB84-176072] N84-27368
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
An experiment proposed and set up by the readers will be flying on board the Shuttle; these are the rules of the game; the experiments of others
[NASA-TM-77102] N84-26718

Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 259)
[NASA-SP-7011(259)] N84-27415

Abundances in galactic H2 regions, 3: G25.4-0.2, G45.5+0.06, M8, S150 and DR22
[NASA-TM-85962] N84-27616

Solar Irradiance Variations on Active Region Time Scales
[NASA-CP-2310] N84-27635

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.

A computational method for viscous incompressible flows
[NASA-TM-85958] N84-26664

A solution procedure for three-dimensional incompressible Navier-Stokes equation and its application
[NASA-TM-85978] N84-26666

An analysis of rotor blade twist variables associated with different Euler sequences and pretwist treatments
[NASA-TM-84394] N84-26693

Fan blade shake test results for the 40- by 80-foot/80- by 120-foot wind tunnel
[NASA-TM-85859] N84-26753

W3 North: Far-infrared and radio molecular observations
[NASA-TM-85961] N84-27615

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

Spaceborne sensors (1983-2000 AD): A forecast of technology
[NASA-TM-86083] N84-26743

Outgassing data for selecting spacecraft materials
[NASA-RP-1124] N84-26751

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[NASA-TM-83916] N84-27319

A comparative review of bow shocks and magnetopauses
[NASA-TM-86114] N84-27353

The Z3 model of Saturns magnetic field and the Pioneer 11 vector helium magnetometer observations
[NASA-TM-86118] N84-27623

Interaction of the plasma tail of comet Bradfield 1979L on 1980 February 6 with a possibly flare-generated solar-wind disturbance
[NASA-TM-85817] N84-27632

Energy flow continuity in solar active regions N84-27643

Temporal variations of solar UV spectral irradiance caused by solar rotation and active region evolution N84-27650

Thermal bifurcation in the upper solar photosphere inferred from heterodyne spectroscopy of OH rotational lines
[NASA-TM-86128] N84-27654

A radiometric Bode's Law: Predictions for Uranus
[NASA-TM-86074] N84-27659

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.

Performance criteria guideline for three explosion protection methods of electrical equipment rated up to 15,000 volts AC
[NASA-TM-85528] N84-26667

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.

Natural laminar flow experiments on modern airplane surfaces
[NASA-TP-2256] N84-26660

Aerodynamic design using numerical optimization
[NASA-TM-85550] N84-26661

Spatial derivatives of flow quantities behind curved shocks of all strengths
[NASA-TM-85782] N84-26665

Low-speed investigation of effects of wing leading- and trailing-edge flap deflections and canard incidence on a fighter configuration equipped with a forward-swept wing
[NASA-TM-85795] N84-26667

Calculation of vertical and ramp-assisted takeoffs for supersonic cruise fighters
[NASA-TM-85818] N84-26668

Support interference of wind tunnel models: A selective annotated bibliography
[NASA-TM-81909] N84-26708

Aerothermal performance and damage tolerance of a Rene 41 metallic standoff thermal protection system at Mach 6.7
[NASA-TM-85773] N84-26739

Selection of actuator locations for static shape control of large space structures by heuristic integer programing
[NASA-TM-85769] N84-26741

A numerical study of the 2- and 3-dimensional unsteady Navier-Stokes equations in velocity-vorticity variables using compact difference schemes
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Analysis of lateral and torsional vibration characteristics of beams and shafts with end located rotational masses
[NASA-TM-84593] N84-27065

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[NASA-TM-85791] N84-27066

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Upset susceptibility study employing circuit analysis and digital simulation
[NASA-TM-85822] N84-27374

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[NASA-TM-85821] N84-27376

Care 3: Hands-on demonstration and tutorial
[NASA-TM-85811] N84-27448

STABCAR: A program for finding characteristic root systems having transcendental stability matrices
[NASA-TP-2165] N84-27461

A new method for determining acoustic-liner admittance in a rectangular duct with grazing flow from experimental data
[NASA-TP-2310] N84-27543

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Space power technology into the 21st Century
[NASA-TM-83690] N84-26746

Microstructure and orientation effects on properties of discontinuous silicon carbide/aluminum composites
[NASA-TP-2302] N84-26749

ICAN: Integrated composites analyzer
[NASA-TM-83700] N84-26755

Interply layer degradation effects on composite structural response
[NASA-TM-83702] N84-26756

Effects of alloy composition on cyclic flame hot-corrosion attack of cast nickel-base superalloys at 900 deg C
[NASA-TP-2338] N84-26783

P/M superalloys: A troubled adolescent?
[NASA-TM-83623] N84-26785

Some fundamental aspects of solidification in a supercooled melt
[NASA-TM-83714] N84-26787

Sputtered coatings for protection of spacecraft polymers
[NASA-TM-83706] N84-26803

Design of power-transmitting shifts
[NASA-RP-1123] N84-27041

Spin analysis of concentrated traction contacts
[NASA-TM-83713] N84-27042

An analysis of traction drive torsional stiffness
[NASA-TM-83712] N84-27043

Large, horizontal-axis wind turbines
[NASA-TM-83546] N84-27327

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Natural environment design criteria for the space station program definition phase
[NASA-TM-82585] N84-26740

Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms
[NASA-CP-2303] N84-27262

Irradiance from stars based on blackbody theory
[NASA-TM-82582] N84-27617

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

Operational loads on B-747 aircraft: Design assumptions, actual experience and maintenance aspects N84-26569

A quasi-simultaneous calculation method for strongly interacting viscous flow around an infinite swept wing
[NLR-MP-83001-U] N84-26672

Integrating multigrid relaxation into a robust fast-solver for transonic potential flows around lifting airfoils
[NLR-MP-83021-U] N84-26673

Transonic panel method for the full potential equation applied to multi-component airfoils
[NLR-MP-83030-U] N84-26674

Half-model testing in the NLR High Speed Tunnel (HST): Its technique and application
[NLR-MP-83036-U] N84-26675

Operational loads on B-747 aircraft: Design assumptions, actual experience and maintenance aspects
[NLR-MP-83051-U] N84-26697

Operating conditions and materials selection and development in gas turbines
[NLR-MP-81012-U] N84-26705

Inertial-optical attitude determination and model following control of maneuvering spacecraft
[NLR-MP-83053-U] N84-26742

Fugacity of gaseous hydrogen
[NLR-MP-83038-U] N84-27019

A numerical view on strong viscous-inviscid interaction
[NLR-MP-83049-U] N84-27020

Uniaxial model for gas-loaded variable conductance heat pipe performance; the effects of vapor flow, friction and inertia
[NLR-MP-83058-U] N84-27021

The K-distributions extrapolated on the basis of stress intensity rates
[NLR-MP-83048-U] N84-27073

Hot spot reflectance measurements applied to green biomass estimation and crop growth monitoring
[NLR-MP-83037-U] N84-27323

Flight Track and Aircraft Noise Monitoring System (FANAMOS)
[NLR-MP-83043-U] N84-27343

Implementation of cellular-logic operators using 3 x 3 convolution and table look-up hardware
[NLR-MP-83039-U] N84-27454

Comparison of some software reliability models for simulated and real failure data
[NLR-MP-83032-U] N84-27481

A data management and presentation tool for engineering and research
[NLR-MP-83044-U] N84-27482

An axiomatic theory of concentration and diversity
[NLR-MP-83015-U] N84-27531

Contributions to the theory of sound propagation in ducts with bulk-reacting lining
[NLR-MP-83064-U] N84-27551

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

Reference flat pulse generator
[PB84-162163] N84-27030

2.0 GHz to 4.0 GHz automated radiometer operation and service manual
[PB84-165158] N84-27031

Introduction to STARPAC. The standards time series and regression package
[PB84-178367] N84-27492

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Techniques in high-temperature resistance thermometry. 1: Construction of the NBS-design high temperature platinum resistance thermometer. 2: Toroidal resistor for high-temperature platinum resistance thermometers
[PB84-164110] N84-27029

Materials research activities at the National Bureau of Standards (1975-1982) pertaining to active solar heating and cooling systems
[PB84-154780] N84-27332

Comparing software development methodologies for Ada (trade name): A study plan
[PB84-178029] N84-27491

Assessment of techniques for evaluating computer systems for Federal Agency procurements
[PB84-176494] N84-27496

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.

Applications of airborne remote sensing in atmospheric sciences research N84-27286

Evaluation of meteorological airborne Doppler radar N84-27287

NATIONAL CENTRAL UNIV., CHUNG-LI (TAIWAN).
Chung-Li, Taiwan dual mode (Doppler and spaced antenna) VHF radar: Preliminary specifications N84-27141

NATIONAL DEFENSE UNIV., WASHINGTON, D. C.
Cohesion in the US military
[AD-A140828] N84-27439

NATIONAL ENVIRONMENTAL SATELLITE SERVICE, WASHINGTON, D. C.
Fire detection using the NOAA (National Oceanic and Atmospheric Administration)-series satellites
[PB84-176690] N84-27324
Mariners Weather Log, Volume 28, Number 1, January-February-March 1984
[PB84-175710] N84-27385

NATIONAL INST. OF MENTAL HEALTH, ROCKVILLE, MD.
Neurophysiological approaches to higher brain functions
[PB84-175769] N84-27434

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Jet stream related observations by MST radars N84-27078
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.
Study of NOAA (National Oceanic and Atmospheric Administration) WP-3D terminal navigation errors based on navigators logbooks: 1977-1983
[PB84-155736] N84-26662

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORMAN, OKLA.
Real time divergence measurement from single Doppler radar
[AD-A140568] N84-26966

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
The variability of the surface wind field in the equatorial Pacific Ocean: Criteria for satellite measurements N84-27296

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
The NESDIS-SEL Lear aircraft instruments and data recording system
[NOAA-TR-NESDIS-9] N84-26698
The impact of satellite temperature soundings on the forecasts of a small national meteorological service N84-27295
Recent advances in multispectral sensing of ocean surface temperature from space N84-27297

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).
The density of liquid slags containing iron oxide
[NPL-DMA(A)-75] N84-26782
Tutorial material on the real data types in Ada
[NFL-DITC-34/83] N84-27458

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).
Degradation of the bird impact resistance of polycarbonate
[AD-P003193] N84-26606
Comparison of bullet resistance of new and aged polycarbonate
[AD-P003198] N84-26611

NATIONAL SEVERE STORMS LAB., NORMAN, OKLA.
Fresnel zone considerations for reflection and scatter from refractive index irregularities N84-27091
An evaluation of the accuracy of some radar wind profiling techniques N84-27109

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, WASHINGTON, D.C.
Americal National Standard X3.102 user reference manual
[PB84-155571] N84-26977
Effect of bandwidth and interference rejection on the spectrum efficiency of land mobile radio systems
[PB84-158369] N84-26978

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Upgraded aircraft accident recorder standards N84-26574

NAVAL AIR TEST CENTER, PATUXENT RIVER, MD.
The silicon AIDS (Airborne Integrated Data Systems) N84-26583
Crash Position Indicator/Crash Survival Flight Data Recorder (CPI/CSFDR): Ejectable versus nonejectable N84-26584

NAVAL FACILITIES ENGINEERING COMMAND, ALEXANDRIA, VA.
Architecture earth-sheltered buildings: Design Manual 1.4
[AD-A140831] N84-26820

NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
The satellite altimeter as a platform for observation of the oceanic mesoscale N84-27299
The depiction of Alboran Sea Gyre during Donde Va? using remote sensing and conventional data N84-27306
The importance of altimeter and scatterometer data for ocean prediction N84-27316
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Analyzing temperature data from XBT grid surveys
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NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
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NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Specialized common carriers: Long distance alternatives for military installations
[AD-A140596] N84-26967
A comparison of the tube-side performance of enhanced heat transfer tubing for Naval condensers
[AD-A126938] N84-27008
Flow visualization study of natural convection from a heated protrusion in a liquid filled rectangular enclosure
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[AD-A140847] N84-27015
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HP-41C programs and instructions for probability and statistics
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High-speed recursive digital filter realization
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[AD-A140900] N84-27581
The decision for the optimal price in competitive bidding: The case of a Korean construction company
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[AD-A140627] N84-27587
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Control systems
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An analysis of Department of Defense financial and acquisition policies in support of military contingency requirements
[AD-A140820] N84-27607

NAVAL RESEARCH LAB., WASHINGTON, D. C.
The effects of moisture on fracture toughness and thermal relaxation of stretched acrylic plastics
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Fluroepoxy and fluroacrylic transparencies
[AD-P003201] N84-26614
The dual-frequency scatterometer reexamined N84-27280
An improved dual-frequency technique for the remote sensing of ocean currents and wave spectra N84-27281

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
Mixing-length formulations for turbulent boundary layers over arbitrarily rough surfaces
[AD-A140560] N84-27009

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
TRISTEN/FRAM IV arctic ambient noise measurements
[AD-A140656] N84-27549

NEBRASKA UNIV., LINCOLN.
Optimum backscatter cross section of the ocean as measured by synthetic aperture radars N84-27276

NEW MEXICO STATE UNIV., LAS CRUCES.
Temporal albedo variations in Saturn's atmosphere N84-27627

NEW YORK UNIV., NEW YORK.
The method of complex characteristics for design of transonic compressors N84-26659
A rigid embedding of the closed Friedmann manifold N84-27502

NORTH CAROLINA STATE UNIV., RALEIGH.
Fundamental studies of growth, doping and transformation in beta silicon carbide
[AD-A140924] N84-27582

NORTH TEXAS STATE UNIV., DENTON.
Study of VUV generation by coherent resonant frequency mixing in metal vapors
[AD-A140800] N84-26989

NORTHEAST RADIO OBSERVATORY CORP., WESTFORD, MASS. HAYSTACK OBSERVATORY.
Spectral characteristics of the MST radar returns N84-27084
Parametrization of Fresnel returns in middle-atmosphere radar experiments N84-27123

Stratosphere and troposphere (S-T) studies at Millstone Hill. Recent results, capabilities and limitations N84-27137
Data processing techniques used with MST radars: A review N84-27150
Decoding: Software implementations N84-27161
A note on the use of coherent integration in periodogram analysis of MST radar signals N84-27163

NORTON (KENT K.), GARDEN GROVE, CALIF.
Land use planning for sources of nonionizing electromagnetic radiation
[PB84-156363] N84-27584

O

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).
Stratospheric concentration of nitric acid, ozone and sulphurous carbonyl: Measurement of nitric acid absorption in the Q branch of the v4 band as a function of temperature
[AD-B071596] N84-27336

OFFICE OF NAVAL RESEARCH, BAY ST. LOUIS, MISS.
Progress report abstracts, Oceanic Biology Program
[AD-A140840] N84-27390

OFFICE OF NAVAL RESEARCH, SAN FRANCISCO, CALIF.
ONR (Office of Naval Research) Far East Scientific Bulletin. Volume 9, Number 1, January to March 1984
[AD-A140828] N84-27589
Japanese research institutes funded by private corporations
[AD-A140892] N84-27600

OFFICE OF SOFTWARE DEVELOPMENT, FALLS CHURCH, VA.
Gould Incorporated, Gould concept 32/87, FORTRAN 77/X32 Rel. 2.0
[PB84-175603] N84-27488
Gould Incorporated, Gould Concept 32/87, FORTRAN 77+ Rel.4.0
[PB84-175629] N84-27489
IBM Corporation, IBM 4341, IBM BASIC/MVS release 1.0
[PB84-175611] N84-27490

OHIO STATE UNIV., COLUMBUS.
Identification of scattering mechanisms from measured impulse response signatures of several conducting objects
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[NASA-CR-173649] N84-27354
Suppression of asymmetric acid efflux and gravitropism in maize roots treated with auxin transport inhibitors or sodium orthovanadate
[NASA-CR-173634] N84-27395
Report on the feasibility of designing expert systems for contract price analysis
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OMEGA-P, INC., NEW HAVEN, CONN.
Gyrotron backward-wave oscillator
[AD-A140908] N84-26993

OREGON STATE UNIV., CORVALLIS.
Linearized model for wind turbines in yaw N84-27325
A numerical study of the coastal stratus cloud in a two-dimensional meso-scale model N84-27371

P

PEL, INC., BATON ROUGE, LA.
Interactive risk analysis and development of standardized factors
[AD-A140758] N84-27473

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Utilization of alternative fuels in diesel engines
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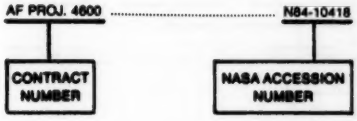

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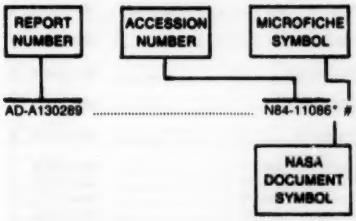

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